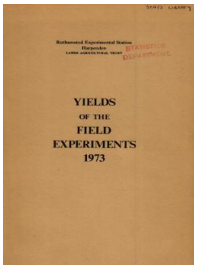
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Yields of the Field Experiments 1973

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

YIELDS

of the

FIELD

EXPERIMENTS

1973

This report includes only experiments conducted at Rothamsted, Woburn, Saxmundham and some at Brooms Barn. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

The design and supervision of the field experiments are the responsibility of the Field Plots Committee (members in 1973: G.W. Cooke (Chairman), G.V. Dyke (Secretary), J. McEwen (Deputy Secretary), L. Fowden, I.G. Graham-Bryce, J.M. Hirst, A.E. Johnston, F.G.W. Jones, J.R. Moffatt, R. Moffitt, J.A. Nelder, C.P. Whittingham).

Price: 1.00

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R = Rothamsted W = Woburn S = Saxmundham BB = Broom's Barn

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CONVENTIONS 1973

For each experiment current treatments are shown, together with their factor and level names which are used in the tables. The program used for the analyses of these experiments limits level names to eight characters, and factor names similarly, though a suffix of up to 3 digits in brackets may be appended if required.

For each experiment, other than annuals, references are given for previous years. These refer to the '(Numerical)(Results) yields of the Field Experiments' - (t) indicates a year when treatments were described. For the classical and some long-term experiments reference is made to 'Details' - a separate publication, giving a full description of treatments until 1967, with full title 'Details of the Classical and Long Term Experiments up to 1967'.

The following conventions are observed unless otherwise stated.

All areas are in hectares. All plot dimensions are in metres.

All seed rates, rates of application of fertilisers, sprays etc. are per hectare.

All yields and plant numbers are per hectare.

The following abbreviations are used in variate headings:

Wheat, barley, oats, rye, beans etc.

Grain:	Grain (at 85% dry matter)
Straw:	Straw (at 85% dry matter)

Sugar beet

Roots:	Roots (washed)
Sugar %:	Sugar percentage

All crops

Mean D.M. %:	Mean dry matter % as harvested

For any other crop, details of abbreviations are given as necessary.

'Nitro-Chalk' refers to the grade containing 25% N.

Compound fertilisers indicated thus - (20:10:10) = compound fertiliser (20% N, 10% P_2O_5, 10% K_2O), granular unless otherwise stated.

Treatment of cereal seed with organo mercury and gamma BHC should be assumed in this report, exceptions are noted.

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Harvest Areas for Cereals

On most of those cereal experiments at Rothamsted and Woburn (but not Saxmundham) which are harvested by combine the 'blank-row' technique is used to distinguish the areas taken for yield from the discard areas. When seed is drilled in rows 7in. (18 cm.) apart (the most common arrangement), appropriate coulters are prevented from sowing and 8 or 16 rows are left for yield according to the cutter-bar width of the combine to be used. If the row-spacing is other than 7 in. a similar arrangement is used but with a different number of rows.

The ends of plots are separated from each other or from headlands by 3 ft (91 cm.) fallow paths made after the crop has established.

The 'Area harvested' in the 'Yields', when the blank-row technique is used, is the product:-

number of rows harvested x distance between rows x length of rows.

A series of experiments by Widdowson at Rothamsted (68/Da/9, 68/Db/1, 69/R/W/13, 69/R/B/5, 70/R/WW/3) showed that on average the yield of 16 rows (50 ft (1.5 m) long) was 7.8% greater with blank rows than without.

If no rows are left blank and the plot is wider than the combine harvester so that discards are left uncut, the 'Area harvested' is the product:-

width of cutter bar x length of rows.

If the plot is narrower than the combine so that the whole area between paths is cut, the 'Area harvested' is the product:-

number of rows x distance between rows x length of rows.

We do not apply the adjustment used by some workers who take the harvested area as width x length where each is measured to the centre of 'paths' up to a maximum of 18 in (46 cm).

Standard errors

NOTE: This report gives standard errors of differences, not of means.

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73/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous winter wheat. Since 1968 two three-year rotations have been included: potatoes, beans, wheat and fallow, wheat, wheat.

The 130th year, wheat, potatoes, beans. The sixth year of the revised scheme.

For previous years see 'Details' 1967, Station Report for 1966, pp.229-231, Station Report for 1968, Part 2, 68/A/1(t) and 69-72/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	5, 6 and 7	0.00659
	8 and 9	0.00694
Potatoes:	2	0.00659
Beans:	4	0.00741

Treatments:

Whole plots: Fertilisers and organic manures:-

Plot	Treatments till 1967	Treatments from 1968	PLOT
01	-	D N2 P K	01DN2PK
21	D	D N2	21DN2
22	D	D	22D
03	None	None	03O
05	P K Na Mg	P K Na Mg	05MIN
06	N1 P K Na Mg	N1 P K Na Mg	06N1MIN
07	N2 P K Na Mg	N2 P K Na Mg	07N2MIN
08	N3 P K Na Mg	N3 P K Na Mg	08N3MIN
09	N*1 P K Na Mg	N4 P K Na Mg	09N4MIN
10	N2	N2	10N2
11	N2 P	N2 P	11N2P
12	N2 P Na	N2 P Na	12N2PNa
13	N2 P K	N2 P K	13N2PK
14	N2 P Mg	N2 P K Mg	14N2PKMg
15	N2 P K Na Mg	N3 P K Na Mg	15N3MIN
16	N*2 P K Na Mg	N2 P K Na Mg	16N2MIN
17	+N2	N2 1/2(P K Na Mg)	17N2MINH
18	+ P K Na Mg	N2 1/2(P K Na Mg)	18N2MINH
19	C	C	19C
20	N2 K Na Mg	N2 K Na Mg	20NKNaMg

\+ Alternating

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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' from 1968).
P: Superphosphate to supply 34 kg P
K: Sulphate of potash to supply 90 kg K
Na: Sulphate of soda to supply 16 kg Na (57 kg on Plot 12)
Mg: Sulphate of magnesia to supply 11 kg Mg (31 kg on Plot 14)
D: Farmyard manure at 35 tonnes
C: Castor meal to supply 96 kg N
MIN: P K Na Mg

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:-

	1968	1969	1970	1971	1972	1973	SECTION
Section 0	W (last fallowed 1951)	W	W	W	W	W	SC0/W22
Section 1	W (last fallowed 1966)	W	W	W	W	W	SC1/W7
Section 2	BE	W	P	BE	W	P	SECTION2
Section 3	W (last fallowed 1967)	W	F	W	W	F	-
Section 4	W (last fallowed 1965)	P	BE	W	P	BE	SECTION4
Section 5	W (last fallowed 1965)	F	W	W	F	W	SC5/W1F
Section 6	F	W	W	F	W	W	SC6/W2
Section 7	P	BE	W	P	BE	W	SC7/W1BE
Section 8*	W (last fallowed 1963)	W	W	W	F	W	SC8/W1F
Section 9	W (last fallowed 1958)	W	W	W	W	W	SC9/W15

W = wheat, P = potatoes, BE = beans, F = Fallow

* No weedkillers

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

Standard applications:-
Winter wheat: Terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l). Dicamba, mecoprop and MCPA ('Tetralex Plus' at 9.1 l in 290 l).
Potatoes: Weedkiller: Linuron at 3.8 kg plus paraquat at 0.42 kg ion in 450 l. Fungicide: Manozeb at 1.35 kg in 370 l on two occasions. Insecticide: Demethon-s-methyl at 0.25 kg applied with the mancozeb on the first occasion.
Spring beans: Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Winter wheat: Cappelle, seed dressed with dieldrin, sown at 200 kg.
Potatoes: King Edward, Rothamsted once grown.
Spring beans: Maris Bead, sown at 220 kg.

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Cultivations, etc.:

ALL SECTIONS: Autumn fertilisers applied: 3 Oct, 1972. FYM applied: 11 Oct. Ploughed: 10-12 Oct.

CROPPED SECTIONS:

Winter wheat: Seed sown: 17 Oct, 1972. 'Prebane' applied: 20 Oct. N applied: 13 Apr, 1973. 'Tetralex Plus' applied: 26 Apr. Combine harvested: 20 Aug.

Potatoes: N applied: 21 Mar, 1973. Potatoes machine planted: 6 Apr. Linuron plus paraquat applied: 11 May. Mancozeb and demeton-s-methyl applied: 2 July. Manncozeb applied: 24 July, 9 Aug. Haulm destroyed mechanically, sprayed with undiluted BOV at 220 l: 31 Aug. Lifted: 25 Sept.

Spring beans: N applied: 8 Mar, 1973. Seed sown: 9 Mar. Insecticide applied: 8 June. Combine harvested: 3 Sept.

FALLOW SECTION: Ploughed second time: 16 May, 1973, third time: 9 July.

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73/R/BK/1

TABLES OF MEANS

WHEAT

GRAIN: TONNES/HECTARE

SECTION

PLOT	SC7/W1BE	SC5/W1F	SC6/W2	SC1/W7	SC9/W15	SC0/W22	SC8/W1F	Mean
01DN2PK	4.83	4.44	4.66					
21DN2	4.30	4.13	4.33	4.82	4.48	3.54	4.06	4.24
22D	5.74	5.22	6.03	6.22	6.45	5.98	4.22	5.69
030	2.42	3.69	1.05	1.87	1.43	1.68	3.83	2.28
05MIN	3.07	4.14	1.30	1.81	2.04	2.08	5.25	2.81
06N1MIN	5.54	5.85	3.92	3.79	4.26	3.96	3.58	4.41
07N2MIN	5.99	5.04	5.57	5.43	5.75	5.40	3.98	5.31
08N3MIN	3.90	4.62	5.46	5.05	5.74	4.70	3.19	4.67
09N4MIN	3.66	4.07	4.67	5.26	5.38	4.46	3.85	4.48
10N2	4.89	5.47	3.14	3.54	2.60	3.15	3.68	3.78
11N2P	5.40	4.55	4.84	3.26	2.74	3.14	2.04	3.71
12N2PNa	6.42	5.10	5.30	4.92	4.42	4.78	3.59	4.93
13N2PK	6.63	5.92	5.08	5.49	5.92	5.01	3.86	5.42
14N2PKMg	6.96	6.09	5.27	5.62	6.05	4.83	4.48	5.61
15N3MIN	4.97	4.03	5.85	6.05	6.23	5.04	3.86	5.15
16N2MIN	6.52	5.66	5.18	5.11	5.28	4.73	3.53	5.14
17N2MINH	6.77	5.68	4.99	4.78	5.24	4.40	4.27	5.16
18N2MINH	6.62	5.42	5.11	4.80	5.57	4.17	3.82	5.07
19C	6.85	4.62	4.75	4.17	4.67	4.49	4.77	4.90
20NKNaMg				3.72		3.40		

Mean D.M. %: 85.9

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73/R/BK/1

WHEAT

STRAW: TONNES/HECTARE

SECTION

PLOT	SC7/W1BE	SC5/W1F	SC6/W2	SC1/W7	SC9/W15	SC0/W22	SC8/W1F	Mean
01DN2PK	8.79	6.63	7.78					
21DN2	7.66	7.80	7.20	7.78	8.12	5.91	7.52	7.43
22D	9.78	7.77	5.86	6.85	7.74	6.08	8.18	7.47
030	1.84	3.14	0.65	1.20	0.97	1.22	3.30	1.76
05MIN	2.57	3.85	0.72	1.47	1.12	1.31	6.62	2.52
06N1MIN	5.27	5.92	2.63	2.68	3.43	3.12	7.18	4.32
07N2MIN	6.35	5.86	4.15	4.51	5.44	5.08	7.51	5.56
08N3MIN	6.11	7.11	5.67	4.75	6.34	4.50	6.27	5.82
09N4MIN	5.55	5.20	5.41	5.30	6.28	4.98	7.21	5.70
10N2	2.93	4.44	2.50	2.15	3.78	2.10	4.57	3.21
11N2P	4.14	3.75	3.30	2.84	2.89	3.10	4.91	3.56
12N2PNa	5.30	5.50	4.14	3.44	4.36	3.33	6.04	4.59
13N2PK	6.82	6.51	3.71	4.29	6.09	4.88	8.19	5.78
14N2PKMg	6.63	6.57	4.63	4.19	5.23	4.29	7.28	5.55
15N3MIN	6.85	6.10	5.42	5.21	6.05	5.51	8.30	6.21
16N2MIN	6.82	6.94	4.81	4.06	4.96	4.91	7.91	5.77
17N2MINH	6.80	6.28	4.47	3.30	5.11	3.48	8.45	5.41
18N2MINH	6.74	6.72	5.07	3.70	5.33	3.54	8.64	5.68
19C	6.31	5.77	4.71	3.20	5.01	3.58	7.71	5.18
20NKNaMg				2.62		2.64		

Mean D.M. % 88.8

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	SECTION 2		SECTION 4	
	POTATOES		SPRING BEANS	
PLOT	TOTAL TUBERS: TONNES/ HECTARE	% WARE 3.81 CM (1.5 INCH) RIDDLE	GRAIN: TONNES/ HECTARE	STRAW: TONNES/ HECTARE
01DN2PK	38.9	93.2	4.26	2.63
21DN2	48.8	96.8	4.00	2.90
22D	47.1	93.2	4.20	2.61
030	13.5	84.3	2.56	0.83
05MIN	21.7	85.8	3.80	1.91
06N1MIN	29.6	89.8	3.93	2.43
07N2MIN	42.1	92.6	3.70	2.94
08N3MIN	48.5	94.0	4.39	3.56
09N4MIN	49.2	93.3	4.07	3.28
10N2	14.5	85.5	2.39	0.68
11N2P	12.2	56.6	1.40	1.79
12N2PNa	14.8	61.5	1.58	0.88
13N2PK	33.3	89.5	3.73	2.61
14N2PKMg	32.3	83.3	2.49	2.44
15N3MIN	47.2	94.8	4.45	2.92
16N2MIN	37.0	91.0	3.96	2.42
17N2MINH	34.9	90.0	4.09	2.44
18N2MINH	35.8	92.6	3.77	2.14
19C	24.1	91.3	2.10	1.92
Mean D.M. %			82.4	83.8

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73/R/HB/2

HOOSFIELD

Object: To study the effects of organic and inorganic manures on continuous spring barley. Since 1968 a rotation of potatoes, beans and barley has been included.

The 122nd year, potatoes, beans and barley. The 6th year of revised scheme.

For previous years see 'Details' 1967, Station Report for 1966, 68/A/2(t), 69/R/HB/2(t), 70-72/R/HB/2.

Treatments to barley: All combinations of:- 1. Fertilisers, organic manures and frequency of barley cropping:-

Form of N 1852-1966	Additional treatments 1852-1973		MANURE
None	-	Continuous	---CON
None	P	Continuous	-P-CON
None	K Na Mg	Continuous	--KCON
None	P K Na Mg	Continuous	-PKCON
A	-	Continuous	A--CON
A	P	Continuous	AP-CON
A	K Na Mg	Continuous	A-KCON
A	P K Na Mg	Continuous	APKCON
N	-	Continuous	N--CON
N	- Si	Continuous	N--SiCON
N	-	In rotation (P,BE,B)	N--RTN
N	- Si	In rotation (P,BE,B)	N--SiRTN
N	P	Continuous	NP-CON
N	P Si	Continuous	NP-SiCON
N	P	In rotation (P,BE,B)	NP-RTN
N	P Si	In rotation (P,BE,B)	NP-SiRTN
N	K Na Mg	Continuous	N-KCON
N	K Na Mg Si	Continuous	N-KSiCON
N	K Na Mg	In rotation (P,BE,B)	N-KRTN
N	K Na Mg Si	In rotation (P,BE,B)	N-KSiRTN
N	P K Na Mg	Continuous	NPKCON
N	P K Na Mg Si	Continuous	NPKSiCON
N	P K Na Mg	In rotation (P,BE,B)	NPKRTN
N	P K Na Mg Si	In rotation (P,BE,B)	NPKSiRTN
C	-	Continuous	C--CON
C	-	In rotation (P,BE,B)	C--RTN
C	P	Continuous	CP-CON
C	P	In rotation (P,BE,B)	CP-RTN
C	K Na Mg	Continuous	C-KCON
C	K Na Mg	In rotation (P,BE,B)	C-KRTN
C	P K Na Mg	Continuous	CPKCON
C	P K Na Mg	In rotation (P,BE,B)	CPKRTN
None	D	Continuous	DCON
(D)	-	Continuous	(D)CON
(Ashes)	-	Continuous	(A)CON
None	-	Continuous	-CON

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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: Superphosphate to supply 34 kg P.
K: Sulphate of potash to supply 90 kg K.
Na: Sulphate of soda to supply 16 kg Na.
Mg: Sulphate of magnesia to supply 11 kg Mg.
Si: Silicate of soda at 448 kg.
D: Farmyard manure at 35 tonnes, (D): until 1871 only.
(Ashes): Weed ash 1852-1916, Furnace ash 1917-1932. None since.

2. Nitrogen fertiliser (kg N), as 'Nitro-Chalk', since 1968 — N

None	0
48	48
96	96
144	144

There are four extra plots:- — EXTRA

Plot 551	A N2 P K Continuous	551AN2PK
Plot 561	- P K Continuous	561--PK
Plot 571	N N2 Continuous	571NN2--
Plot 581	N N2 Continuous	581NN2--

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

Treatments to potatoes and beans:- All combinations of:-

1. Fertiliser and organic manures: — MANURE

1852-1966	1852-1973	
C	-	C--
C	P	CP-
C	K Na Mg	C-K
C	P K Na Mg	CPK

2. Nitrogen fertiliser (kg N), as 'Nitro-Chalk': — N

Beans (residual effects, applied to previous barley)	Potatoes (applied 1973)	Beans	Potatoes
None	None	(0)	0
48	96	(48)	96
96	192	(96)	192
144	288	(144)	288

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

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Standard applications:
Potatoes: Weedkiller: Linuron at 1.1 kg plus paraquat at 0.42 kg ion in 450 l. Fungicide: Mancozeb at 1.35 kg in 370 l on three occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the mancozeb on the first occasion.
Spring beans: Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.
Barley: Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l).

Seed: Potatoes: King Edward, Rothamsted once grown.
Spring beans: Maris Bead, sown at 220 kg.
Barley: Julia, seed dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Fertilisers, except N, applied: 1 Nov, 1972.
FYM applied: 3 Nov. Ploughed: 6 Nov. N applied: 22 Mar, 1973.
Potatoes: Planted: 6 Apr, 1973. Weedkiller applied: 15 May. Fungicide plus insecticide applied: 2 July. Fungicide applied: 18 July, 9 Aug. Haulm destroyed mechanically, sprayed with indiluted BCV at 220 l: 31 Aug. Lifted: 26 Sept.
Spring beans: Seed sown: 8 Mar, 1973. Insecticide applied: 8 June. Combine harvested: 3 Sept.
Barley: Seed sown: 8 Mar, 1973. Weedkiller applied: 11-15 May. Combine harvested: 10 Aug.

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73/R/HB/2

TABLES OF MEANS

BARLEY

GRAIN: TONNES/HECTARE

MANURE	N 0	48	96	144	Mean
---CON	0.57	1.42	1.64	1.53	1.29
-P-CON	1.06	2.77	3.27	2.88	2.49
--KCON	0.49	2.94	3.75	4.25	2.86
-PKCON	0.84	3.59	5.09	5.29	3.70
A--CON	1.01	1.07	1.05	1.25	1.10
AP-CON	1.27	2.40	2.25	1.89	1.95
A-KCON	0.85	2.21	2.09	1.98	1.78
APKCON	1.11	3.48	4.66	4.97	3.56
N--CON	1.22	1.59	1.73	1.52	1.52
N--SICON	1.38	3.38	5.12	4.10	3.50
N--RTN	2.89	4.66	4.33	4.19	4.02
N--SIRTN	3.97	5.00	5.06	5.04	4.77
NP-CON	1.77	3.52	4.04	3.89	3.31
NP-SICON	1.66	4.29	5.31	4.71	3.99
NP-RTN	4.12	5.36	5.70	5.27	5.11
NP-SIRTN	4.91	6.05	6.08	5.69	5.68
N-KCON	1.24	2.31	2.99	3.04	2.39
N-KSICON	1.56	3.55	4.66	5.15	3.73
N-KRTN	3.15	4.55	4.73	5.10	4.38
N-KSIRTN	3.70	5.00	5.86	5.59	5.04
NPKCON	1.38	3.86	5.11	5.11	3.87
NPKSICON	1.75	4.18	5.28	4.57	3.95
NPKRTN	3.81	5.65	5.55	5.69	5.18
NPKSIRTN	3.82	5.64	5.43	5.86	5.19
C--CON	1.53	3.63	4.82	5.01	3.75
C--RTN	3.50	4.87	5.37	5.25	4.75
CP-CON	2.01	4.12	4.52	4.59	3.81
CP-RTN	4.30	5.68	5.83	4.83	5.16
C-KCON	1.59	3.78	4.97	5.50	3.96
C-KRTN	3.27	4.87	5.57	5.16	4.72
CPKCON	2.14	4.21	5.08	4.88	4.08
CPKRTN	4.51	5.76	5.00	5.32	5.15
DCON	6.02	5.45	5.73	4.95	5.54
(D)CON	1.12	3.40	5.76	5.08	3.84
(A)CON	0.90	3.36	3.50	4.21	2.99
-CON	0.73	1.82	2.44	3.06	2.02

Mean D.M. % 82.5

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73/R/HB/2

BARLEY

STRAW: TONNES/HECTARE

	N				
	0	48	96	144	Mean
MANURE					
---CON	0.19	0.95	1.15	1.13	0.85
-P-CON	0.58	1.53	1.90	2.11	1.53
--KCON	0.19	1.86	2.82	3.64	2.13
-PKCON	0.37	2.30	3.80	4.54	2.75
A--CON	0.38	0.56	0.74	0.77	0.61
AP-CON	0.56	1.29	1.53	1.92	1.33
A-KCON	0.57	1.53	1.32	1.69	1.28
APKCON	0.76	1.95	3.83	3.79	2.58
N--CON	0.55	0.84	0.85	0.56	0.70
N--SiCON	0.56	1.69	2.55	1.99	1.70
N--RTN	1.11	1.69	2.20	2.22	1.81
N--SiRTN	1.67	1.97	2.27	2.50	2.10
NP-CON	0.83	1.67	2.24	2.24	1.74
NP-SiCON	0.56	1.97	2.29	2.54	1.84
NP-RTN	1.95	2.53	2.78	3.08	2.58
NP-SiRTN	2.23	2.77	3.32	3.42	2.93
N-KCON	0.28	1.38	1.63	1.69	1.24
N-KSiCON	0.57	1.39	2.24	2.79	1.75
N-KRTN	1.40	2.18	2.80	2.75	2.28
N-KSiRTN	1.67	2.80	3.34	3.62	2.86
NPKCON	0.54	1.92	3.06	3.69	2.30
NPKSiCON	0.57	1.98	3.34	3.36	2.31
NPKRTN	1.39	3.08	3.90	3.60	2.99
NPKSiRTN	1.69	3.40	3.63	3.65	3.09
C--CON	0.29	1.43	1.71	2.58	1.50
C--RTN	0.85	2.30	2.26	2.86	2.07
CP-CON	0.56	1.71	2.23	2.57	1.76
CP-RTN	1.44	2.82	2.83	2.88	2.49
C-KCON	0.57	1.69	2.85	3.39	2.13
C-KRTN	1.42	2.28	2.84	3.02	2.39
CPKCON	0.55	1.94	3.05	3.38	2.23
CPKRTN	1.67	2.82	3.13	3.71	2.83
DCON	4.91	4.48	4.59	5.30	4.82
(D)CON	0.49	2.06	3.78	3.32	2.41
(A)CON	0.51	2.02	1.99	2.54	1.76
-CON	0.51	1.27	1.73	2.30	1.45

Mean D.M. % 81.2

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73/R/HB/2

BARLEY

EXTRA

551AN2PK	561--PK	571NN2--	581NN2--
GRAIN: TONNES/HECTARE			
5.32	0.94	3.93	2.16
STRAW: TONNES/HECTARE			
3.53	0.64	2.12	1.43

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73/R/HB/2

POTATOES

N

MANURE	0	96	192	288	Mean
	TOTAL TUBERS: TONNES/HECTARE				
C--	17.1	17.2	16.0	28.8	19.8
CP-	18.3	15.3	16.3	23.4	18.3
C-K	33.6	23.1	41.5	42.2	35.1
CPK	23.9	36.1	41.6	41.7	35.8
Mean	23.2	22.9	28.9	34.0	27.3
	PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE				
C--	87.5	82.6	83.7	91.5	86.3
CP-	83.1	78.4	74.9	87.0	80.9
C-K	95.2	90.9	94.9	94.5	93.9
CPK	88.2	90.4	93.9	92.0	91.1
Mean	88.5	85.6	86.9	91.3	88.1

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73/R/HB/2

BEANS

N

MANURE	(0)	(48)	(96)	(144)	Mean
	GRAIN: TONNES/HECTARE				
C--	4.03	3.97	3.90	3.38	3.82
CP-	1.90	2.00	2.30	2.18	2.10
C-K	3.93	3.37	3.33	3.79	3.60
CPK	4.51	4.65	4.88	4.06	4.53
Mean	3.59	3.50	3.60	3.35	3.51
	STRAW: TONNES/HECTARE				
C--	0.94	1.59	1.28	0.63	1.11
CP-	1.20	0.59	0.91	1.21	0.98
C-K	1.56	1.58	1.92	1.91	1.74
CPK	2.55	2.85	3.02	2.37	2.70
Mean	1.56	1.65	1.78	1.53	1.63

Mean D.M. % Grain: 83.5
Straw: 82.9

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73/R/WF/3

WHEAT AND FALLOW

Object: To study the effects of fallowing for one or three years on unmanured winter wheat - Hoosfield.

The 118th year, winter wheat.

For previous years see 'Details' 1967, 68/A/3(t), 69-72/R/WF/3.

Whole plot dimensions: 9.61 x 52.1. Area harvested: 0.01483.

Treatments: Phase of fallowing cycle (up to 1973):-

									PLOT
Plot 1	W	F	W	F	W	F	F	F	-
Plot 2	F	W	F	F	F	W	F	W	2/Fall1
Plot 3	F	F	W	F	W	F	W	F	-
Plot 4	F	W	F	W	F	F	F	W	4/Fall3
Plot 5	W	F	F	F	W	F	W	F	-
Plot 6	F	W	F	W	F	W	F	F	-
Plot 7	W	F	W	F	F	F	W	F	-
Plot 8	F	F	F	W	F	W	F	W	8/Fall1

W = wheat, F = fallow.

Basal applications: Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l).

Seed: Cappelle, dressed with dieldrin, sown at 200 kg.

Cultivations, etc.:- Ploughed: 11 Sept, 1972. Seed drilled: 18 Oct. Weedkiller applied: 26 Apr, 1973. Combine harvested: 20 Aug. Fallow plots: Ploughed 3 times: 11 Sept, 1972, 17 May, 1973 and 6 July.

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73/R/WF/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

PLOT

2/Fall1	8/Fall1	4/Fall3	Mean
2.56	2.20	2.88	2.55

STRAW: TONNES/HECTARE

1.93	1.34	1.87	1.71

Mean D.M. % Grain: 86.1
Straw: 88.3

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73/R/EX/4

EXHAUSTION LAND

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

The 118th year, barley.

For previous years see 'Details' 1967, 68/A/7 and 69-72/R/EX/4.

Area harvested: 0.03000.

Treatments: Fertiliser and farmyard manure 1876-1901 (now all given 87.5 kg N combine drilled):-

	PLOTFERT(01)
Plot 1 None	1-
Plot 2 None	2-
Plot 3 D	3D
Plot 4 D	4D
Plot 5 N	5N
Plot 6 N*	6N*
Plot 7 N P K Na Mg	7NMIN
Plot 8 N* P K Na Mg	8N*MIN
Plot 9 P	9P
Plot 10 P K Na Mg	10MIN

N - Ammonium salts to supply 96 kg N
N* - Nitrate of soda to supply 96 kg N
P - Superphosphate to supply 34 kg P
K - Sulphate of potash to supply 137 kg K
Na - Sulphate of soda to supply 16 kg Na
Mg - Sulphate of magnesia to supply 11 kg Mg
D - Farmyard manure at 35 tonnes
MIN - P K Na Mg

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

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Ploughed: 12 Sept, 1972. Seed sown: 9 Mar, 1973. Sprayed with dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l): 18 May. Combine harvested: 9 Aug.

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73/R/EX/4

TABLE OF MEANS

	TONNES/HECTARE	
	GRAIN	STRAW
PLOTFERT(01)		
1-	1.29	2.17
2-	1.27	2.86
3D	4.91	5.99
4D	4.85	5.65
5N	1.22	1.92
6N*	1.16	**
7NMIN	4.25	5.49
8N*MIN	4.20	5.61
9P	4.00	5.22
10MIN	4.29	5.21
Mean D.M. %	80.7	94.2

** Not recorded.

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73/R/PG/5

PARK GRASS

Object: To study the effects of organic and inorganic manures on permanent grass (for hay). The effects of liming are also studied.

The 118th year, hay.

For previous years see 'Details' 1967, 68/A/6(t), 69-71/R/PG/5 and 72/R/PG/5(t).

Treatments:

Whole plots: Fertilisers and organic manures:-

		MANURE
Plot 1	N1	N1
Plot 2	None (D until 1863)	0(D)
Plot 3	None	0/PLOT3
Plot 4-1	P	P
Plot 4-2	N2 P	N2P
Plot 6	N1 P K Na Mg	N1MIN
Plot 7	P K Na Mg	MIN
Plot 8	P Na Mg	PNaMg
Plot 9	N2 P K Na Mg	N2MIN
Plot 10	N2 P Na Mg	N2PNaMg
Plot 11-1	N3 P K Na Mg	N3MIN
Plot 11-2	N3 P K Na Mg Si	N3MINSi
Plot 12	None	0/PLOT12
Plot 13	D/F	D/F
Plot 14	N2* P K Na Mg	N2*MIN
Plot 15	P K Na Mg (N2* until 1875)	MIN(N2*)
Plot 16	N1* P K Na Mg	N1*MIN
Plot 17	N1*	N1*
Plot 18	N2 K Na Mg	N2KNaMg
Plot 19	D	D
Plot 20	D/N*P K	D/N*PK

N1, N2, N3:	Sulphate of ammonia to supply 48, 96, 144 kg N
N1*, N2*:	Nitrate of soda to supply 48, 96 kg N
P:	Superphosphate to supply 34 kg P (17 kg P to Plot 20 in years with no farmyard manure)
K:	Sulphate of potash to supply 224 kg K (45 kg K to Plot 20 in years with no farmyard manure)
Na:	Sulphate of soda to supply 16 kg Na
Mg:	Sulphate of magnesia to supply 11 kg Mg
Si:	Silicate of soda at 448 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

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Sub plots:	Liming (none to Plot 12):-	LIME
a	Ground chalk applied as necessary to maintain pH found in 1965	a
b	Ground chalk applied as necessary to achieve pH6	b
c	Ground chalk applied as necessary to achieve pH5	c
d	None	d

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO3 applied every fourth year 1924-1964):-

18-1	None	N2KNaMg0
18-2	13.5	N2KNaMg2
18-3	7.9	N2KNaMg1
19-1	None	D0
19-2	6.3	D2
19-3	1.1	D1
20-1	None	D/N*PK0
20-2	5.6	D/N*PK2
20-3	1.1	D/N*PK1

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 fertilisers applied: 15 Nov, 1972. FYM applied: 16 Nov. N applied: 1st dressing - 26 Feb, 1973, 2nd dressing - 23 Mar. Cut twice: 13 June, 18 Sept.

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73/E/PG/5

TABLE OF MEANS

DRY MATTER: TONNES/HECTARE

	1st cut LIME					2nd cut LIME				
	a	b	c	d	Mean	a	b	c	d	Mean
MANURE										
N1	1.90	2.34	2.09	0.61	1.73	1.95	2.34	0.69	0.30	1.32
0(D)	1.52	1.57	1.41	1.19	1.42	1.70	1.80	1.31	1.24	1.51
0/PLOT3	1.67	1.69	1.20	1.24	1.45	1.47	1.63	1.04	1.15	1.32
P	1.97	2.12	2.23	2.10	2.10	1.96	1.95	2.10	1.81	1.96
N2P	3.78	3.19	3.83	2.58	3.35	1.42	1.29	1.01	1.11	1.21
N1MIN	5.50	5.51			5.51	3.14	3.54			3.34
MIN	5.66	5.65	3.03	3.02	4.34	4.35	4.00	2.40	2.01	3.12
PNaMg	1.83	1.87	3.01	2.86	2.39	2.49	2.25	3.01	2.90	2.66
N2MIN	7.26	6.98	7.34	4.48	6.52	4.00	3.84	1.87	1.71	2.86
N2PNaMg	4.58	4.29	4.64	3.11	4.15	1.60	1.54	1.14	1.11	1.35
N3MIN	7.99	6.98	8.01	4.65	6.91	3.54	3.16	2.32	2.91	2.98
N3MINSi	8.07	8.34	8.61	7.05	8.02	4.22	4.36	2.82	3.58	3.74
0/PLOT12	1.48		1.27		1.38	1.97		1.56		1.76
D/F	5.29	5.51	5.35	4.53	5.17	3.94	4.23	3.36	2.79	3.58
N2*MIN	6.16	6.89	8.43	8.03	7.38	1.88	3.40	3.80	3.28	3.09
MIN(N2*)	4.74			2.76	3.75	3.69			1.98	2.83
N1*MIN	5.29	6.20	5.70	5.03	5.56	3.10	3.21	2.67	2.33	2.83
N1*	2.36	2.24	2.59	2.64	2.46	2.01	1.69	1.71	2.26	1.92
N2KNaMg0			3.25	1.14	2.20			0.94	0.22	0.58
N2KNaMg2	2.51				2.51	2.43				2.43
N2KNaMg1	2.73	2.94			2.84	2.43	2.34			2.38
D0	5.84				5.84	3.53				3.53
D2	5.97				5.97	4.04				4.04
D1	6.00				6.00	4.16				4.16
D/N*PK0	5.61				5.61	3.93				3.93
D/N*PK2	5.51				5.51	3.92				3.92
D/N*PK1	5.87				5.87	3.94				3.94
Mean D.M. %		25.2					25.0			

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73/R/PG/5

DRY MATTER: TONNES/HECTARE

Total of 2 cuts

	LIME				
	a	b	c	d	Mean
MANURE					
N1	3.85	4.68	2.78	0.91	3.05
0(D)	3.22	3.37	2.73	2.43	2.94
0/PLOT3	3.14	3.32	2.24	2.39	2.77
P	3.92	4.07	4.33	3.91	4.06
N2P	5.20	4.48	4.85	3.69	4.55
N1MIN	8.64	9.05			8.85
MIN	9.71	9.65	5.44	5.03	7.46
PNaMg	4.32	4.13	6.02	5.76	5.05
N2MIN	11.26	10.83	9.22	6.19	9.37
N2PNaMg	6.18	5.83	5.78	4.22	5.50
N3MIN	11.54	10.14	10.33	7.57	9.89
N3MINSi	12.29	12.70	11.43	10.63	11.76
0/PLOT12	3.45		2.83		3.14
D/F	9.24	9.74	8.72	7.32	8.76
N2*MIN	8.05	10.29	12.23	11.31	10.47
MIN(N2*)	8.42			4.74	6.58
N1*MIN	8.40	9.42	8.37	7.35	8.38
N1*	4.37	3.93	4.30	4.90	4.38
N2KNaMg0			4.19	1.35	2.77
N2KNaMg2	4.94				4.94
N2KNaMg1	5.16	5.29			5.22
D0	9.37				9.37
D2	10.01				10.01
D1	10.16				10.16
D/N*PK0	9.54				9.54
D/N*PK2	9.43				9.43
D/N*PK1	9.82				9.82

Mean D.M. % 25.1

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73/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 fourth year of revised scheme. Crops, barley and sugar beet.

For previous years see 'Details' 1967, 68/A/4, 69/R/AG/6, 70/R/AG/6(t), 71/R/AG/6(t) and 72/R/AG/6(t).

Treatments: All combinations of:-

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

None	None
P K Na Mg	PKNaMg
N P K Na Mg C	NPKNaMgC

N: Sulphate of ammonia to supply 48 kg N
P: Superphosphate to supply 41 kg P
K: Sulphate of potash to supply 224 kg K
Na: Sulphate of soda to supply 16 kg Na
Mg: Sulphate of magnesia to supply 11 kg Mg
C: Castor meal at 2240 kg supplying about 112 kg N

2. Rotation 1848-1951 — OLDROTN

With fallow: Roots (turnips or swedes), barley, fallow, wheat	Fallow
With legume: Roots, barley, legume (clover or beans), wheat	Legume

Half plots: 3. Residues of 1964 treatments — 1964RESD

P	P
K	K

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

Arable or fallow	Arable
Grass	Grass

Sixteenth plots: 5. Rates of 1964 treatments (kg) — P20564 K2064

P205 to P-test half plots	K20 to K-test half plots	P20564	K2064
None	None	0	0
500	315	500	315
1000	630	1000	630
2000	1260	2000	1260

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Sixty fourth plots:

6. On P-test half plots: Residuals of P2O5 applied 1970-72 (total, kg) To barley	On K-test half plots: K2O applied 1973 (kg) To barley	To s.beet	P2O5(70-2) Barley	K2O73 Barley	S.Beet
None	None	None	0	0	0
375	60	310	375	60	310

Strips of sixty fourth plots:

7. On P-test half plots: N (kg) to barley 1973	On K-test half plots: Crops in 1973	N73	CROP
63	Barley	63	Barley
94	Sugar beet	94	Sugrbeet

Sub plot dimensions: Plots 1, 2, 3 and 4 - 6.04 x 3.02. Plots 5, 6 - 5.43 x 3.02. Area harvested: Barley: P-test plots: 0.00087, K-test plots: 0.00074, sugar beet: 0.00077.

Standard applications:

Barley: Manures: None on P-test half plots. (30:13:0) at 320 kg on K-test half plots. Weedkillers: Dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l in 340 l).

Sugar beet: Manures: N at 190 kg as 'Nitro-Chalk. P2O5 at 125 kg as superphosphate. MgO at 100 kg as kieserite. Insecticide: Menazon ('Saphi-Col' at 0.7 l in 340 l).

Seed: Barley: Julia, dressed with ethirimol, sown at 160 kg.
Sugar beet: Klein E sown at 5.6 kg.

Cultivations etc.:- All plots ploughed: 27 Oct, 1972.

Barley: Manures applied, seed sown: 13 Mar, 1973. Weedkiller applied: 11 May. Harvested: 10 Aug.

Sugar beet: Manures applied: 19 Mar, 1973. Power harrowed: 21 Mar. Seed sown: 22 Mar. Singled: 30 May. Insecticide applied: 14 June, 6 July, 23 July. Lifted: 17-24 Oct.

Erratum to 'Yields' 1972 72/R/AG/6 p.29

The NPK columns of means should be headed

1 2 not 2 1

https://doi.org/10.23637/ERADOC-1-98 *pp 33*

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TABLES OF MEANS

BARLEY

P-TEST HALF PLOTS

GRAIN: TONNES/HECTARE

OLDRESD / OLDROTN			None		PKNaMg		NPKNaMgC		Mean
			Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Arable									
P2O5(70-2)	P20564	N73							
0	0	63	5.71	4.70	6.03	4.76	4.51	6.28	5.33
0	0	94	4.43	6.27	5.62	5.92	6.53	6.12	5.81
0	500	63	5.63	4.23	6.41	4.67	4.65	5.59	5.20
0	500	94	5.31	6.15	5.44	6.12	6.07	5.22	5.72
0	1000	63	5.87	4.79	6.34	4.98	4.80	6.63	5.57
0	1000	94	5.42	6.41	5.73	6.45	6.55	5.79	6.06
0	2000	63	5.72	4.76	6.30	5.15	5.06	5.89	5.48
0	2000	94	5.24	6.18	5.79	6.27	6.71	5.78	6.00
375	0	63	6.10	4.82	5.87	3.98	5.02	6.25	5.34
375	0	94	4.98	6.17	5.74	6.03	6.05	6.07	5.84
375	500	63	5.84	4.81	6.35	4.68	5.22	6.21	5.52
375	500	94	5.83	5.93	5.89	6.28	5.69	5.59	5.87
375	1000	63	5.86	4.80	6.31	5.54	5.37	6.49	5.72
375	1000	94	5.98	6.56	5.84	5.83	6.35	6.38	6.16
375	2000	63	6.05	4.54	6.37	5.17	5.19	5.79	5.52
375	2000	94	5.45	6.37	5.84	5.83	6.21	6.19	5.97
Mean			5.59	5.47	5.99	5.48	5.62	6.01	5.69

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BARLEY

P-TEST HALF PLOTS

GRAIN: TONNES/HECTARE

OLDRESD / OLDROTH			None		PKNaMg		NPKNaMgC		Mean
			Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Grass									
P205(70-2)	P50264	N73							
0	0	63	4.51	2.34	5.06	5.02	5.90	5.47	4.72
0	0	94	3.86	3.96	4.98	5.24	5.32	5.60	4.83
0	500	63	6.39	6.56	6.12	5.41	6.08	6.20	6.13
0	500	94	5.83	5.87	6.08	5.42	5.84	5.46	5.75
0	1000	63	6.81	6.57	6.42	6.11	5.53	6.45	6.31
0	1000	94	6.23	6.18	6.28	6.33	4.16	5.77	5.82
0	2000	63	6.14	6.47	6.36	6.40	5.72	6.56	6.27
0	2000	94	6.34	6.07	5.82	6.03	4.95	5.99	5.87
375	0	63	6.28	6.69	6.39	6.32	5.90	6.27	6.31
375	0	94	5.84	6.36	5.80	6.18	5.91	5.43	5.92
375	500	63	6.31	5.98	5.85	6.38	5.98	5.33	5.97
375	500	94	5.92	6.01	6.01	6.48	6.01	5.25	5.95
375	1000	63	6.39	6.29	6.43	6.03	5.61	6.65	6.23
375	1000	94	5.93	6.37	6.09	6.20	4.97	5.77	5.89
375	2000	63	6.25	6.40	6.42	6.21	6.08	6.59	6.32
375	2000	94	6.18	6.56	6.37	6.69	5.38	5.59	6.13
Mean			5.95	5.92	6.03	6.03	5.58	5.90	5.90

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BARLEY

K-TEST HALF PLOTS

GRAIN: TONNES/HECTARE

	OLDRES	None		PKNaMg		NPKNaMgC		
	OLDROTN	Fallow	Legume	Fallow	Legume	Fallow	Legume	Mean
PREVCROP Arable								
K2073	K2064							
0	0	4.67	4.79	5.20	4.96	5.45	6.09	5.19
0	315	4.85	5.69	4.81	6.08	6.14	5.08	5.44
0	630	4.85	5.02	4.95	5.82	5.41	5.86	5.32
0	1260	5.12	5.01	5.05	5.47	5.45	4.58	5.11
60	0	4.61	4.47	4.25	4.99	5.67	6.09	5.01
60	315	4.76	5.04	4.77	5.76	5.76	4.99	5.18
60	630	4.87	5.22	4.74	5.31	5.33	6.06	5.26
60	1260	4.75	4.86	5.12	5.29	5.65	4.96	5.11
Mean		4.81	5.01	4.86	5.46	5.61	5.46	5.20
PREVCROP Grass								
K2073	K2064							
0	0	5.56	5.78	5.65	6.43	7.59	6.55	6.26
0	315	6.07	6.07	5.76	6.69	6.93	6.58	6.35
0	630	5.54	6.00	5.72	5.94	6.55	6.01	5.96
0	1260	6.23	5.62	5.67	6.21	6.36	5.61	5.95
60	0	6.21	6.01	6.24	6.66	6.70	6.39	6.37
60	315	6.28	6.27	6.01	6.51	7.17	6.61	6.47
60	630	5.32	5.59	5.87	6.03	6.83	6.37	6.00
60	1260	5.22	6.11	5.60	5.75	6.25	6.14	5.84
Mean		5.80	5.93	5.81	6.28	6.80	6.28	6.15

Mean D.M. % 84.7

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BARLEY

K-TEST HALF PLOTS

STRAW: TONNES/HECTARE

OLDRESD		None		PKNaMg		NPKNaMgC		
OLDROTN		Fallow	Legume	Fallow	Legume	Fallow	Legume	Mean
PREVCROP Arable								
K2073	K2064							
0	0	2.62	2.94	3.50	3.52	3.11	4.20	3.31
0	315	2.86	3.72	3.00	3.76	3.74	2.79	3.31
0	630	2.76	3.24	2.91	3.66	3.24	3.44	3.21
0	1260	3.00	3.09	3.36	3.62	2.86	2.52	3.08
60	0	2.47	3.10	2.18	2.87	3.06	3.85	2.92
60	315	2.79	3.32	2.88	3.83	2.64	2.70	3.03
60	630	2.78	2.77	3.09	3.56	2.70	4.19	3.18
60	1260	3.10	3.01	3.11	3.71	3.49	2.47	3.15
Mean		2.80	3.15	3.00	3.57	3.10	3.27	3.15
PREVCROP Grass								
K2073	K2064							
0	0	2.90	3.34	2.68	3.27	3.25	3.56	3.17
0	315	3.56	3.92	3.54	4.06	4.37	4.00	3.91
0	630	3.33	3.48	3.61	4.63	4.09	5.10	4.04
0	1260	4.01	4.49	3.32	4.52	4.28	4.58	4.20
60	0	3.17	3.39	3.14	3.67	3.99	3.94	3.55
60	315	4.10	3.86	3.78	4.49	5.14	4.44	4.30
60	630	3.37	4.44	3.54	4.45	3.95	5.11	4.14
60	1260	3.23	4.04	4.11	4.85	4.52	5.14	4.32
Mean		3.46	3.87	3.46	4.24	4.20	4.48	3.95

Mean D.M. % 72.9

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SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

OLDRESD		None		PKNaMg		NPKNaMgC		
OLDROTN		Fallow	Legume	Fallow	Legume	Fallow	Legume	Mean
PREVCROP Arable								
K2073	K2064							
0	0	45.9	37.0	41.3	43.4	48.4	48.0	44.0
0	315	43.8	37.0	44.5	48.3	43.6	43.0	43.4
0	630	45.0	40.5	49.6	47.6	45.2	46.1	45.7
0	1260	38.5	43.2	44.3	50.0	43.4	49.7	44.8
310	0	39.6	33.0	31.1	52.4	49.1	47.1	42.0
310	315	38.8	41.7	42.7	51.6	44.5	44.8	44.0
310	630	43.3	40.7	47.9	51.8	46.9	48.3	46.5
310	1260	48.5	39.5	47.4	46.2	48.2	50.7	46.7
Mean		42.9	39.1	43.6	48.9	46.1	47.2	44.6
PREVCROP Grass								
K2073	K2064							
0	0	40.5	36.2	33.3	37.9	35.7	29.8	35.6
0	315	41.9	44.4	46.1	44.3	44.0	41.4	43.7
0	630	39.1	41.3	44.7	48.8	43.1	41.3	43.0
0	1260	46.3	51.0	46.7	39.5	46.3	43.0	45.5
310	0	42.0	41.4	45.3	42.6	50.7	41.0	43.8
310	315	46.2	42.8	39.2	49.6	44.5	42.6	44.1
310	630	42.6	47.0	42.7	42.5	47.8	44.8	44.6
310	1260	42.8	50.3	48.3	50.0	49.4	47.9	48.1
Mean		42.7	44.3	43.3	44.4	45.2	41.5	43.5

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SUGAR BEET

SUGAR PERCENTAGE

OLDRESD / OLDROTN		None		PKNaMg		NPKNaMgC		Mean
		Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Arable								
K2073	K2064							
0	0	17.1	16.8	16.4	16.7	16.3	17.0	16.7
0	315	17.1	16.6	16.1	15.8	16.2	16.3	16.4
0	630	16.5	16.9	16.6	15.8	16.9	17.0	16.6
0	1260	17.2	17.1	16.2	17.3	16.6	16.8	16.9
310	0	17.5	16.1	17.0	17.0	16.8	17.4	17.0
310	315	17.4	17.3	16.8	17.1	16.2	17.3	17.0
310	630	17.2	17.5	16.8	17.1	16.9	17.0	17.1
310	1260	17.2	17.4	16.8	17.2	16.4	16.9	17.0
Mean		17.2	16.9	16.6	16.8	16.5	17.0	16.8
PREVCROP Grass								
K2073	K2064							
0	0	14.9	14.9	15.8	15.5	14.9	14.9	15.2
0	315	15.3	16.2	16.4	15.8	15.9	15.5	15.9
0	630	15.6	16.0	16.6	16.0	16.6	15.9	16.1
0	1260	16.4	15.6	16.5	16.1	16.1	16.1	16.2
310	0	16.3	15.6	15.8	16.0	15.9	16.2	16.0
310	315	16.7	17.1	16.6	17.1	16.3	15.9	16.6
310	630	16.9	16.3	16.7	15.8	16.1	15.9	16.3
310	1260	16.8	16.0	16.8	16.8	16.6	15.6	16.4
Mean		16.1	16.0	16.4	16.1	16.1	15.8	16.1

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SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

OLDRESD / OLDROTN		None		PKNaMg		NPKNaMgC		Mean
		Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Arable								
K2073	K2064							
0	0	7.84	6.20	6.76	7.25	7.90	8.16	7.35
0	315	7.50	6.13	7.16	7.65	7.09	7.02	7.09
0	630	7.43	6.84	8.22	7.55	7.62	7.82	7.58
0	1260	6.62	7.39	7.19	8.63	7.18	8.33	7.56
310	0	6.95	5.30	5.27	8.92	8.24	8.21	7.15
310	315	6.74	7.22	7.17	8.84	7.21	7.77	7.49
310	630	7.46	7.11	8.04	8.87	7.93	8.19	7.93
310	1260	8.36	6.86	7.97	7.93	7.91	8.59	7.94
Mean		7.36	6.63	7.22	8.21	7.63	8.01	7.51
PREVCROP Grass								
K2073	K2064							
0	0	6.05	5.41	5.25	5.88	5.34	4.44	5.40
0	315	6.42	7.20	7.54	7.01	7.01	6.44	6.94
0	630	6.10	6.62	7.41	7.80	7.15	6.58	6.94
0	1260	7.61	7.98	7.73	6.37	7.48	6.92	7.35
310	0	6.83	6.44	7.18	6.80	8.09	6.67	7.00
310	315	7.71	7.32	6.50	8.45	7.28	6.75	7.34
310	630	7.21	7.66	7.15	6.69	7.68	7.12	7.25
310	1260	7.18	8.06	8.12	8.38	8.22	7.47	7.90
Mean		6.89	7.09	7.11	7.17	7.28	6.55	7.01

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SUGAR BEET

TOPS: TONNES/HECTARE

OLDRESD / OLDROTN		None		PKNaMg		NPKNaMgC		Mean
		Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Arable								
K2073	K2064							
0	0	22.8	22.8	27.0	24.7	31.7	33.5	27.1
0	315	19.5	26.8	23.5	35.2	31.1	29.9	27.7
0	630	23.5	22.8	24.7	30.5	31.1	32.9	27.6
0	1260	18.8	28.2	25.2	32.3	32.9	37.6	29.2
310	0	20.8	23.5	21.7	29.4	34.1	33.5	27.1
310	315	20.8	19.5	23.5	39.9	39.9	25.8	28.2
310	630	26.2	23.5	25.2	34.1	36.4	33.5	29.8
310	1260	23.5	22.8	25.2	25.8	35.2	36.4	28.2
Mean		22.0	23.7	24.5	31.5	34.1	32.9	28.1
PREVCROP Grass								
K2073	K2064							
0	0	41.6	37.6	28.8	39.3	46.4	42.3	39.3
0	315	41.6	30.2	37.6	39.3	43.4	43.4	39.3
0	630	28.9	25.5	28.8	35.2	38.7	44.6	33.6
0	1260	42.9	36.2	37.0	29.9	37.6	47.0	38.4
310	0	38.2	40.3	36.4	41.1	47.6	44.0	41.3
310	315	43.6	27.5	32.3	37.0	51.1	48.7	40.0
310	630	33.5	39.6	35.2	44.0	44.0	54.6	41.8
310	1260	36.9	37.6	35.2	43.4	44.0	51.1	41.4
Mean		38.4	34.3	33.9	38.7	44.1	47.0	39.4

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SUGAR BEET

PLANT NUMBER: THOUSANDS/HECTARE

OLDRESD	OLDROTN	None		PKNaMg		NPKNaMgC		Mean
		Fallow	Legume	Fallow	Legume	Fallow	Legume	
PREVCROP Arable								
K2073	K2064							
0	0	93.2	94.7	93.2	94.5	93.2	84.1	92.1
0	315	97.6	93.2	91.9	90.6	94.5	89.3	92.9
0	630	90.2	87.3	88.0	85.4	84.5	89.3	89.1
0	1260	91.7	93.2	84.1	86.7	97.1	94.5	91.2
310	0	99.1	82.8	60.8	94.5	95.8	88.0	86.8
310	315	99.1	84.3	91.9	88.0	89.3	88.0	90.1
310	630	93.2	82.8	89.3	88.0	94.5	85.4	88.9
310	1260	93.2	82.8	85.4	90.6	102.3	86.7	90.2
Mean		94.7	87.6	85.6	89.8	95.1	88.2	90.2
PREVCROP Grass								
K2073	**K2064**							
0	0	93.2	85.8	86.7	90.6	90.6	82.8	88.3
0	315	97.6	91.7	84.1	91.9	85.4	90.6	90.2
0	630	85.8	84.3	81.5	80.3	90.6	84.1	84.4
0	1260	90.2	91.7	91.9	77.7	93.2	89.3	89.0
310	0	94.7	81.4	88.0	90.6	89.3	89.3	88.9
310	315	97.6	91.7	64.7	90.6	88.0	88.0	86.8
310	630	93.2	84.3	84.1	77.7	89.3	89.3	86.3
310	1260	87.3	87.3	84.1	79.0	91.9	85.4	85.8
Mean		92.5	87.3	83.2	84.8	89.8	87.4	87.5

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73/R/BN/7

BARNFIELD

Object: Originally studied the effects of organic and inorganic manures on continuous roots. The experiment has been modified to study effects on a four-course rotation and continuous beans.

The sixth year of the new scheme, beans, potatoes and sugar beet.

For previous years see 'Details' 1967, 68/A/5(t), 69/R/BN/7, 70/R/BN/7(t), 71/R/BN/7(t) and 72/R/BN/7(t).

Plot dimensions and areas harvested:
Beans, Section 1 (half plot): 10.7 x 27.4 (Strips 1 and 8: 7.01 x 27.4). Area harvested: 0.00878.
Potatoes and sugar beet (quarter plots): 4.27 x 28.5 (Strip 1: 2.74 x 28.5). Area harvested: Potatoes: 0.00390, sugar beet: 0.00098.

Treatments to sugar beet and potatoes (following the rotation potatoes, barley, sugar beet, spring wheat): All combinations of:-
Whole plots: 1. Fertilisers and organic manures:

	MANURE
D	D
D P K	DPK
P K Na Mg	PKNaMg
P	P
P K	PK
P Na Mg	PNaMg
None	None
K Na Mg (to sugar beet only)	KNaMg

P: Superphosphate to supply 34 kg P
K: Sulphate of potash to supply 224 kg K
Na: Agricultural salt (sodium chloride) to supply 90 kg Na
Mg: Sulphate of magnesia to supply 22 kg Mg
D: Farmyard manure at 35 tonnes

Sub plots: 2. Nitrogen fertiliser (kg N) as 'Nitro-Chalk':

	N
None	0
72	72
144	144
216	216

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and partial combinations (excluding treatment K Na Mg) with previous treatments:- 3. Forms of N: RESIDUAL

Nitrate of soda to supply 96 kg N	NS
Sulphate of ammonia to supply 96 kg N	SA
Sulphate of ammonia and castor meal each to supply 96 kg N	SA/C
Castor meal to supply 96 kg N	C

Castor meal last applied 1961, others until 1959.

Treatments to beans (grown continuously since 1967): All combinations of:
Whole plots: 1. Fertilisers and organic manures as for sugar beet and potatoes but excluding K Na Mg: MANURE

Sub plots: 2. Year of applying simazine: SIMAZINE

1.12 kg in 1972, none in 1973 (mechanically weeded)	1972
Mechanically weeded in 1972, 1.12 kg in 1973	1973

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

Standard applications:
Spring beans: Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.
Potatoes: Fungicide: Mancozeb at 1.3 kg in 370 l on two occasions.
Insecticide: Demeton-s-methyl at 0.25 kg in 370 l applied with the mancozeb on the first occasion.
Sugar beet: Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Beans: Maris Bead, sown at 220 kg.
Potatoes: King Edward, Rothamsted, once grown, chitted seed.
Sugar beet: Klein E, sown at 7.8 kg.

Cultivations, etc.: Autumn fertilisers applied: 31 Oct, 1972. FYM applied: 6 Nov. Ploughed: 6-8 Nov.
Spring beans: Seed sown: 13 Mar, 1973. Weedkiller applied: 16 Mar. Insecticide applied: 8 June.
Potatoes: N applied: 20 Mar, 1973. Plots rotary cultivated, potatoes machine planted: 2 Apr. Grubbed: 25 May. Strips 1 & 2 rotary ridged. Strips 1 & 2 grubbed: 7 June. Strips 1 & 2 rotary ridged: 8 June. Strips 4, 5, 6, 7 and 8 rotary ridged: 2 July. Fungicide and insecticide applied: 3 July. Fungicide applied: 24 July. Sprayed with undiluted BOV at 220 l: 20 Sept. Lifted: 15 Oct.
Sugar beet: N applied: 20 Mar, 1973. Seed sown: 22 Mar. Singled: 1-5 June. Insecticide applied: 11 June. Lifted: 13 Nov.

NOTE: At lifting many tubers were found to be affected by pink rot (Phytophthora erythroseptica) and these were not harvested. A more detailed examination on the P K Na Mg strip showed up to 27%, by weight, of diseased tubers.

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TABLES OF MEANS

BEANS

SIMAZINE

MANURE	1972	1973	Mean
	GRAIN: TONNES/HECTARE		
D	2.26	2.71	2.49
DPK	2.98	3.10	3.04
PKNaMg	2.35	0.81	1.58
P	2.26	0.79	1.53
PK	2.06	0.53	1.29
PNaMg	2.22	0.76	1.49
None	1.64	0.47	1.05
Mean	2.25	1.31	1.78
	STRAW: TONNES/HECTARE		
D	4.58	2.05	3.32
DPK	4.60	1.93	3.26
PKNaMg	1.12	0.26	0.69
P	0.83	0.23	0.53
PK	0.92	0.14	0.53
PNaMg	0.97	0.28	0.62
None	0.57	0.34	0.46
Mean	1.94	0.75	1.34

Mean D.M. % Grain 83.1
Straw 92.6

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POTATOES

TOTAL TUBERS: TONNES/HECTARE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	-	30.5	22.4	-
	72	34.0	-	-	51.9
	144	-	53.0	44.5	-
	216	47.8	-	-	33.4
DPK	0	36.4	-	-	24.8
	72	-	52.7	46.5	-
	144	53.3	-	-	44.1
	216	-	50.3	47.4	-
PKNaMg	0	-	9.8	11.7	-
	72	26.4	-	-	23.9
	144	-	21.2	20.4	-
	216	44.0	-	-	44.3
P	0	-	9.0	10.4	-
	72	21.3	-	-	21.1
	144	-	21.0	19.8	-
	216	28.9	-	-	29.8
PK	0	11.6	-	-	11.9
	72	-	17.0	20.2	-
	144	32.7	-	-	36.7
	216	-	31.4	29.7	-
PNaMg	0	12.3	-	-	16.6
	72	-	18.3	20.2	-
	144	31.8	-	-	32.3
	216	-	24.1	32.4	-
None	0	10.2	-	-	11.4
	72	-	10.5	10.0	-
	144	12.4	-	-	13.1
	216	-	10.9	13.5	-

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POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	-	91.7	89.7	-
	72	94.4	-	-	92.2
	144	-	95.7	92.7	-
	216	94.7	-	-	91.4
DPK	0	92.7	-	-	87.7
	72	-	96.7	93.7	-
	144	95.4	-	-	95.9
	216	-	94.2	93.1	-
PKNaMg	0	-	77.5	80.3	-
	72	85.2	-	-	83.4
	144	-	89.9	89.7	-
	216	93.7	-	-	96.6
P	0	-	83.8	81.7	-
	72	91.7	-	-	88.9
	144	-	89.6	85.3	-
	216	93.7	-	-	92.8
PK	0	85.8	-	-	88.2
	72	-	88.2	89.1	-
	144	94.8	-	-	94.6
	216	-	93.2	92.4	-
PNaMg	0	83.3	-	-	86.7
	72	-	85.4	83.7	-
	144	92.6	-	-	94.3
	216	-	85.9	91.8	-
None	0	81.7	-	-	76.6
	72	-	84.3	70.2	-
	144	84.5	-	-	76.9
	216	-	78.7	79.2	-

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SUGAR BEET

ROOTS WASHED: TONNES/HECTARE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	29.1	-	-	32.0
	72	-	47.5	46.8	-
	144	51.1	-	-	46.6
	216	-	51.9	53.7	-
DPK	0	-	32.2	39.5	-
	72	50.9	-	-	44.8
	144	-	53.2	53.7	-
	216	52.0	-	-	53.7
PKNaMg	0	10.7	-	-	11.2
	72	-	22.3	24.7	-
	144	40.9	-	-	39.7
	216	-	50.7	52.0	-
P	0	12.9	-	-	12.9
	72	-	24.4	25.8	-
	144	37.6	-	-	38.3
	216	-	35.4	37.1	-
PK	0	-	8.7	12.3	-
	72	26.0	-	-	26.8
	144	-	40.2	45.9	-
	216	47.6	-	-	46.4
PNaMg	0	-	8.8	13.8	-
	72	24.8	-	-	27.8
	144	-	39.2	46.0	-
	216	47.2	-	-	43.7
None	0	-	7.2	13.9	-
	72	15.7	-	-	25.3
	144	-	30.4	32.2	-
	216	32.1	-	-	34.2
KNaMg	0		11.8		
	72		25.8		
	144		32.7		
	216		38.6		

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SUGAR BEET

SUGAR PERCENTAGE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	17.1	-	-	17.3
	72	-	17.0	17.7	-
	144	17.1	-	-	17.6
	216	-	16.9	16.8	-
DPK	0	-	17.5	17.1	-
	72	17.8	-	-	17.3
	144	-	17.1	17.6	-
	216	16.5	-	-	17.2
PKNaMg	0	17.4	-	-	17.8
	72	-	18.2	17.7	-
	144	18.0	-	-	18.3
	216	-	18.4	18.1	-
P	0	17.3	-	-	17.4
	72	-	17.8	17.8	-
	144	17.3	-	-	17.6
	216	-	17.2	17.2	-
PK	0	-	17.9	17.6	-
	72	17.7	-	-	17.8
	144	-	18.5	18.3	-
	216	17.4	-	-	18.0
PNaMg	0	-	17.8	17.7	-
	72	17.5	-	-	17.4
	144	-	18.1	17.7	-
	216	17.2	-	-	16.9
None	0	-	17.5	17.5	-
	72	17.5	-	-	16.8
	144	-	18.0	17.6	-
	216	16.7	-	-	16.8
KNaMg	0		18.1		
	72		18.3		
	144		18.5		
	216		18.3		

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SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	4.98	-	-	5.53
	72	-	8.07	8.29	-
	144	8.70	-	-	8.20
	216	-	8.76	9.04	-
DPK	0	-	5.63	6.77	-
	72	9.08	-	-	7.74
	144	-	9.08	9.48	-
	216	8.58	-	-	9.23
PKNaMg	0	1.86	-	-	2.00
	72	-	4.07	4.38	-
	144	7.34	-	-	7.29
	216	-	9.32	9.41	-
P	0	2.23	-	-	2.25
	72	-	4.34	4.59	-
	144	6.49	-	-	6.76
	216	-	6.08	6.36	-
PK	0	-	1.56	2.18	-
	72	4.61	-	-	4.76
	144	-	7.45	8.42	-
	216	8.27	-	-	8.36
PNaMg	0	-	1.56	2.43	-
	72	4.34	-	-	4.82
	144	-	7.07	8.15	-
	216	8.13	-	-	7.36
None	0	-	1.26	2.44	-
	72	2.76	-	-	4.25
	144	-	5.47	5.67	-
	216	5.36	-	-	5.75
KNaMg	0		2.13		
	72		4.72		
	144		6.06		
	216		7.09		

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SUGAR BEET

TOPS: TONNES/HECTARE

MANURE	N	RESIDUAL NS	SA	SA/C	C
D	0	9.3	-	-	9.3
	72	-	19.5	12.1	-
	144	20.5	-	-	23.2
	216	-	18.6	21.4	-
DPK	0	-	7.7	11.2	-
	72	14.9	-	-	12.1
	144	-	17.7	12.1	-
	216	23.2	-	-	17.7
PKNaMg	0	2.4	-	-	3.6
	72	-	5.0	4.5	-
	144	10.2	-	-	7.4
	216	-	12.1	10.2	-
P	0	4.2	-	-	3.7
	72	-	6.8	7.0	-
	144	13.0	-	-	14.9
	216	-	14.9	24.2	-
PK	0	-	3.6	4.8	-
	72	6.5	-	-	5.6
	144	-	12.1	12.1	-
	216	19.5	-	-	13.0
PNaMg	0	-	3.2	4.4	-
	72	5.6	-	-	8.4
	144	-	11.2	17.7	-
	216	25.1	-	-	19.5
None	0	-	3.6	4.4	-
	72	5.6	-	-	10.6
	144	-	13.0	14.9	-
	216	26.0	-	-	18.6
KNaMg	0			6.8	
	72			12.1	
	144			8.9	
	216			9.3	

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73/R/GC/8

GARDEN CLOVER

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

The 120th year, red clover.

For previous years see 'Details' 1967, 68/A/8(t) and 69-72/R/GC/8.

Whole plot dimensions: 2.13 x 3.05. Area harvested: 0.00009.

Treatments: Residual effects of fertilisers applied in previous years. All combinations of:-

1. Nitrogen fertiliser (kg N per cut 1967-72): NPERCUT(72)

0	0
126	126

2. Magnesium fertiliser (kg Mg/annum 1968-72): MG(72)

0	0
112	112

NOTES: (1) Plots which had not previously received magnesium were given a corrective dressing of Mg at 500 kg as Epsom salts. The dressing was divided: 335 kg dug down in winter, 110 kg on surface in winter and 55 kg after the first cut.

(2) Plots which previously received nitrogen fertiliser were given a corrective dressing of $CaCO_3$ at 0.8 tonnes as ground chalk. The dressing was divided, half dug down in winter and half on the surface.

Basal applications: Manures: (0:14:28) at 540 kg in winter. K_2O at 75 kg, as muriate of potash, after each cut except the last. Mg at 110 kg, as Epsom salts, in addition to corrective Mg, half in winter, half after first cut. N at 130 kg, as 'Nitro-Chalk', in spring and after each cut except the last. $CaCO_3$ at 1.7 tonnes, as ground chalk, in addition to corrective $CaCO_3$, half dug down in winter and half on the surface.

Seed: English Leafy Broad Red sown at 34 kg.

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Cultivations, etc.:- Area hand dug, all plants removed: 13 Oct, 1972. Half corrective and basal $CaCO_3$, part corrective Mg applied, plots hand dug, remaining half $CaCO_3$, part corrective Mg, basal Mg and basal winter PK applied: 9 Mar, 1973. Area raked down to seedbed, seed sown, basal N applied: 6 Apr. Cut, basal Mg, part corrective Mg, basal K and basal N applied: 24 July. Cut, basal K and basal N applied: 2 Sept. Cut: 4 Oct.

NOTE: Samples of herbage were taken for determinations of N, P, K, Ca, Na and Mg.

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

NPERCUT(72)	0		126		
MG(72)	0	112	0	112	Mean
1st cut	2.78	2.18	3.09	2.35	2.60
2nd cut	1.93	2.29	2.10	1.97	2.07
3rd cut	0.76	0.82	1.01	0.89	0.87
Total of 3 cuts	5.47	5.29	6.19	5.21	5.54

Mean D.M. %	1st cut	14.0
	2nd cut	18.5
	3rd cut	17.2
	Total of 3 cuts	16.6

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73/S/RN/1

ROTATION I

Object: To compare nutrient cycles, uptakes of nutrients and responses to fresh P and K of lucerne and grass leys. To obtain an estimate of the rate of release of nutrients, particularly K, from Saxmundham soil. The effects of lucerne and grass leys will be compared on subsequent arable crops - Saxmundham.

Sponsors: A.E. Johnston, R.C. Flint.

For previous years see 'Details' 1967, 68/A/9(t), 69/S/RN/1(t), 70/S/RN/1(t) and 71-72/S/RN/1.

Treatments: From 1899 to 1969 the experiment followed a four-course rotation of wheat, roots, 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 (OLDTREAT): on the larger sub-plots modified treatments (NEWTREAT) were applied (see below).

In 1970 the rotation was stopped and each pair of blocks was divided

CROP
Lucerne
Grass

Lucerne
Grass
(the OLDTREAT sub-plots form a part of the Grass area).

TREATMENT 1899-1965	OLDTREAT Grass	NEWTREAT Lucerne	NEWTREAT Grass
	MANURE	MANURE	MANURE
D	(D)	(D)	(D)N
B	B	B	BN
N	N	(N2)P2	(N2)P2N
P	P	(N1)P1	(N1)P1N
K	K	(N1)P2K	(N1)P2KN
-	-	(N1)P2	(N1)P2N
PK	PK	(N1)P1K	(N1)P1KN
NK	NK	(N2)P2K	(N2)P2KN
NP	NP	(N2)P1	(N2)P1N
NPK	NPK	(N2)P1K	(N2)P1KN

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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 1970
B: Bone meal at 0.5 tonnes
N: 1899-1965 - Nitrate of soda to supply 38 kg N Since 1970 - 100 kg N (38 kg N on OLDTREAT) as 'Nitro-Chalk'
(N1), (N2): Residues of N applied as 'Nitro-Chalk' 1966-1969: 63, 126 kg N (wheat, sugar beet, barley): 0, 63 kg N (beans)
P: Superphosphate to supply 38 kg P2O5
P1, P2: 50, 100 kg P2O5 as superphosphate
K: 1899-1965 - Muriate of potash to supply 63 kg K2O Unchanged on OLDTREAT since 1966 - 126 kg K2O (63 kg K2O on OLDTREAT) as muriate of potash
NOTE: For a fuller record of treatments see 'Details' etc.

Whole plot dimensions (new treatments): 5.49 x 17.1.
Areas harvested: Grass: 1st cut: New treatments: 0.00130.
Old treatments: 0.00050.
2nd cut: New treatments: 0.00145.
Old treatments: 0.00050.
Lucerne: 1st cut: New treatments: 0.00128.
2nd cut: New treatments: 0.00123.

Seed: Grass: Timothy S 352 and Meadow Fescue S215.
Lucerne: Europe.

Cultivations, etc.:-
Grass: P and K applied: 20 Feb, 1973. Bone meal applied: 27 Feb. N applied: 21 Mar. Cut: 7 June and 26 Sept. N applied after the first cut.
Lucerne: P and K applied: 20 Feb, 1973. Bone meal applied: 27 Feb. Cut: 12 June, 11 Sept.

NOTE: Yields were not taken from old treatment plots on the two southern blocks because of tile-drainage operations.

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73/S/RN/1

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

OLDTREAT - Grass

MANURE

(D)	B	N	P	K	-	PK	NK	NP	NPK	Mean
				1ST CUT						
1.59	0.59	1.79	0.30	0.23	0.33	0.38	1.92	1.89	1.88	1.09
Mean D.M. % 32.3										
				2ND CUT						
0.22	0.00	0.57	0.00	0.00	0.00	0.00	0.57	0.50	1.00	0.29
Mean D.M. % 20.3										
				TOTAL OF 2 CUTS						
1.82	0.59	2.36	0.30	0.23	0.33	0.38	2.49	2.39	2.89	1.38
Mean D.M. % 26.3										

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73/S/RN/1

DRY MATTER: TONNES/HECTARE

NEWTREAT - Lucerne

MANURE

(D)	B	(N2)P2	(N1)P1	(N1)P2K	(N1)P2	(N1)P1K	(N2)P2K	(N2)P1	(N2)P1K	Mean
					1ST CUT					
5.39	4.69	4.66	4.91	5.07	4.60	5.22	5.11	4.46	5.00	4.91
Mean D.M. % 23.3										
					2ND CUT					
4.20	3.19	3.50	3.50	3.64	3.25	3.98	3.93	3.19	3.68	3.61
Mean D.M. % 40.0										
					TOTAL OF 2 CUTS					
9.59	7.88	8.16	8.40	8.71	7.85	9.20	9.04	7.64	8.68	8.52
Mean D.M. % 31.6										

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73/S/RN/1

DRY MATTER: TONNES/HECTARE

NEWTREAT - Grass

MANURE

(D)N	BN	(N2)P2N	(N1)P1N	(N1)P2KN	(N1)P2N	(N1)P1KN	(N2)P2KN	(N2)P1N	(N2)P1KN	Mean
				1ST CUT						
7.08	5.47	5.25	5.31	5.69	5.32	5.75	5.87	5.59	6.08	5.74
Mean D.M. % 27.6										
				2ND CUT						
3.40	2.79	2.76	2.89	3.16	2.76	3.13	3.71	2.42	3.24	3.03
Mean D.M. % 34.9										
				TOTAL OF 2 CUTS						
10.49	8.26	8.01	8.20	8.85	8.08	8.88	9.58	8.01	9.32	8.77
Mean D.M. % 31.3										

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73/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 - Saxmundham.

Sponsors: G.E.G. Mattingly, A.E. Johnston.

The fifth year of revised scheme, potatoes, barley, sugar beet.

For previous years see 'Details' 1967, 68/A/10(t), 69/S/RN/2(t) and 70-72/S/RN/2.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilisers 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. The experiment now tests all combinations of:-

Half blocks: 1. Crops (in rotation potatoes, barley, sugar beet, barley):- CROP

Potatoes	Potatoes
Barley	BafterP
Sugar beet	SugrBeet
Barley	BafterSB

Whole plots: 2. Residues of previous treatments:- RESIDUE

	Approximate total dressing 1899-1964	Total dressing 1965-1967	
Plot 1	None	None	(0)0
Plot 2	400 tonnes FYM	None	(D)0
Plot 3	400 tonnes FYM, 2.7 tonnes P2O5	None	(DP)0
Plot 4	400 tonnes FYM, 2.7 tonnes P2O5	100 tonnes FYM	(DP)D2
Plot 5	400 tonnes FYM, 2.7 tonnes P2O5	100 tonnes FYM, 0.56 tonnes P2O5	(DP)D2P1
Plot 6	400 tonnes FYM, 2.7 tonnes P2O5	0.56 tonnes P2O5	(DP)P1
Plot 7	400 tonnes FYM, 2.7 tonnes P2O5	1.13 tonnes P2O5	(DP)P2
Plot 8	326 tonnes FYM, 4.3 tonnes P2O5 (until 1952 only)	None	(DP52)0

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Sub plots: 3. Phosphate residues 1970-1972 (total P205 applied, kg) — P205RES

None (2 sub plots/plot)	(0)
126	(126)
252	(252)
378	(378)

Potatoes and sugar beet test in addition some of the combinations of 3 with

4. Phosphate in 1973 (kg P205) — P20573

None	0
63	63
189	189

Whole plot dimensions: 3.56 x 5.49. Sub plot area harvested: Potatoes: 0.00078, barley: 0.00056, sugar beet: 0.00100.

Standard applications:

Potatoes: Manures: K20 at 380 kg as muriate of potash before ploughing: (25:0:16) at 1000 kg to seedbed. Weedkiller: Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 340 l. Insecticide: Menazon ('Saphi-Col' at 0.7 l in 340 l) on 3 occasions. Fungicide: Mancozeb at 1.4 kg in 340 l on 4 occasions.

Barley: Manures: (25:0:16) at 400 kg. Weedkiller: Dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l in 340 l). Fungicide: Tridemorph at 5.3 kg applied with the weedkiller.

Sugar beet: Manures: K20 at 380 kg as muriate of potash before ploughing: (25:0:16) at 750 kg to seedbed. Insecticide: Menazon ('Saphi-Col' at 0.7 l in 340 l) on 5 occasions.

Seed: Potatoes: King Edward
Barley: Julia, dressed with ethirimol, sown at 170 kg.
Sugar beet: Klein E rubbed and graded, sown at 18 kg.

Cultivations, etc.:-

Potatoes: Autumn K applied: 22 Sept, 1972. Ploughed: 25 Oct. Basal NK and test P applied: 27 Mar, 1973. Potatoes planted: 16 Apr. Weedkiller applied: 15 May. Insecticide applied: 13 June, 28 June, 10 and 26 July. Fungicide applied: 28 June, 10 and 26 July, 8 and 16 Aug. Harvested by hand: 18 Sept.

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Barley: Ploughed: 25 Oct, 1972. Seed sown and basal NK applied: 20 Mar, 1973. Weedkiller and fungicide applied: 20 May. Harvested by hand: 14 Aug.
Sugar beet: Autumn K applied: 22 Sept, 1972. Ploughed: 25 Oct. Basal NK and test P applied, seed sown: 27 Mar, 1973. Singled: 15 May. Insecticide applied: 13 and 28 June, 10 and 26 July, 8 Aug. Lifted: 15 Oct.

Standard errors per plot.
Barley: After potatoes: Grain, tonnes/hectare: 0.586 or 12.8% (8 d.f.)
After sugar beet: Grain, tonnes/hectare: 0.250 or 5.0% (8 d.f.)

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73/S/RH/2

TABLES OF MEANS

ROTATION 2

POTATOES

TOTAL TUBERS: TONNES/HECTARE

P2O5RES	(0)	(0)	(0)	(126)		(252)		(378)	
P2O5 73	0	63	189	63	189	63	189	63	189
RESIDUE									
(0)0	26.2	33.7			45.3	45.9			46.8
(D)0	38.1		51.1	45.6			43.6	42.4	
(DP)0	41.8		47.4	42.4			47.4	46.5	
(DP)D2	38.1	46.2			46.2	43.6			47.1
(DP)D2P1	45.6		50.3	49.4			48.8	46.5	
(DP)P1	46.8		49.4	43.3			48.5	47.4	
(DP)P2	42.1	44.8			47.1	47.1			48.2
(DP52)0	37.5	48.0			41.0	41.8			50.0

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SUGAR BEET

P2O5RES	(0)	(0)	(0)	(126)		(252)		(378)	
P2O573	0	63	189	63	189	63	189	63	189
	ROOTS(WASHED): TONNES/HECTARE								
RESIDUE									
(0)0	7.2		43.6	38.4			47.3	44.9	
(D)0	30.9	49.4			49.1	44.2			42.3
(DP)0	45.3	48.5			43.0	51.4			43.3
(DP)D2	50.0		48.4	48.6			47.5	50.8	
(DP)D2P1	52.3	50.9			48.4	45.5			51.0
(DP)P1	49.2	49.3			48.4	53.8			49.4
(DP)P2	46.8		53.6	45.9			49.0	47.6	
(DP52)0	49.3		55.0	47.0			51.0	47.4	
	SUGAR PERCENTAGE								
(0)0	13.5		16.7	17.0			17.1	16.9	
(D)0	15.4	17.4			17.3	17.0			17.1
(DP)0	17.3	17.8			17.3	17.0			17.3
(DP)D2	17.2		17.8	17.4			17.3	17.5	
(DP)D2P1	16.8	16.8			17.2	16.6			17.2
(DP)P1	16.9	17.4			17.4	16.5			17.2
(DP)P2	17.0		16.8	16.4			16.8	17.0	
(DP52)0	16.8		17.2	16.9			16.7	16.0	
	TOTAL SUGAR: TONNES/HECTARE								
(0)0	0.97		7.28	6.51			8.12	7.58	
(D)0	4.76	8.61			8.49	7.49			7.22
(DP)0	7.85	8.63			7.42	8.73			7.49
(DP)D2	8.63		8.60	8.45			8.22	8.88	
(DP)D2P1	8.80	8.57			8.34	7.58			8.78
(DP)P1	8.33	8.59			8.44	8.87			8.48
(DP)P2	7.97		9.03	7.54			8.22	8.09	
(DP52)0	8.28		9.46	7.96			8.54	7.58	

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73/S/RN/2

SUGAR BEET

P205RES	(0)	(0)	(0)	(126)		(252)		(378)	
P20573	0	63	189	63	189	63	189	63	189
				TOPS: TONNES/HECTARE					
RESIDUE									
(0)0	10.5		27.8	29.0			31.1	23.8	
(D)0	25.8	33.1			25.4	33.5			30.2
(DP)0	30.7	29.4			27.8	33.1			25.8
(DP)D2	32.7		30.7	31.9			29.8	24.2	
(DP)D2P1	28.6	32.3			34.7	28.6			35.1
(DP)P1	35.1	32.7			32.7	39.1			34.3
(DP)P2	33.9		29.8	35.1			35.5	31.5	
(DP52)0	39.5		35.1	36.7			33.1	41.1	
				PLANT NUMBER: THOUSANDS/HECTARE					
(0)0	84.7		117.6	111.6			106.6	101.7	
(D)0	120.6	113.6			102.7	128.6			108.6
(DP)0	106.6	113.6			113.6	111.6			117.6
(DP)D2	110.6		111.6	117.6			107.6	105.6	
(DP)D2P1	110.6	116.6			110.6	107.6			96.7
(DP)P1	116.6	110.6			116.6	119.6			112.6
(DP)P2	94.7		98.7	113.6			120.6	98.7	
(DP52)0	125.6		115.6	104.6			117.6	109.6	

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73/S/RN/2

BARLEY AFTER POTATOES

P2O5RES

RESIDUE	(0)	(126)	(252)	(378)	Mean
	GRAIN: TONNES/HECTARE				
(0)0	4.51	5.15	5.47	6.01	5.13
(D)0	4.50	3.85	4.50	5.22	4.51
(DP)0	4.40	3.50	4.44	4.41	4.23
(DP)D2	4.67	5.11	4.32	4.40	4.63
(DP)D2P1	4.63	5.23	4.68	4.71	4.78
(DP)P1	4.37	4.02	4.01	4.04	4.16
(DP)P2	5.51	4.28	3.80	5.27	4.87
(DP52)0	4.14	4.44	3.73	5.22	4.33
Mean	4.59	4.45	4.37	4.91	4.58

Mean D.M. % 86.8

STANDARD ERRORS OF DIFFERENCES

	P2O5RES	RESIDUE* P2O5RES
0 v any of remainder	0.256	0.718
Between any of remainder	0.293	0.829

* Within the same level of RESIDUE only

	(0)	(126)	(252)	(378)	Mean
	STRAW: TONNES/HECTARE				
(0)0	3.92	4.59	4.97	5.50	4.58
(D)0	4.88	5.30	5.91	6.04	5.40
(DP)0	4.98	4.73	5.60	5.19	5.10
(DP)D2	5.68	5.24	4.85	5.05	5.30
(DP)D2P1	5.30	5.77	6.10	5.10	5.51
(DP)P1	4.88	4.96	5.58	5.43	5.14
(DP)P2	4.34	4.76	5.17	5.14	4.75
(DP52)0	5.17	5.18	5.15	5.23	5.18
Mean	4.89	5.07	5.41	5.34	5.12

Mean D.M. % 73.6

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73/S/RM/2

BARLEY AFTER SUGAR BEET

P2O5RES

RESIDUE	(0)	(126)	(252)	(378)	Mean
		GRAIN: TONNES/HECTARE			
(0)0	2.15	4.89	5.28	6.19	4.13
(D)0	5.02	4.94	5.55	4.72	5.05
(DP)0	5.47	5.45	4.44	5.62	5.29
(DP)D2	5.33	5.83	5.26	5.82	5.51
(DP)D2P1	5.21	5.27	5.14	5.50	5.26
(DP)P1	5.04	5.60	5.05	4.62	5.07
(DP)P2	4.90	5.54	4.87	4.65	4.97
(DP52)0	5.34	5.44	5.01	4.60	5.14
Mean	4.81	5.37	5.07	5.21	5.05

Mean D.M.% 86.3

STANDARD ERRORS OF DIFFERENCES

	P2O5RES	RESIDUE* P2O5RES
0 v any of remainder	0.108	0.306
Between any of remainder	0.125	0.354

* Within the same level of RESIDUE only

		STRAW: TONNES/HECTARE			
(0)0	2.79	4.65	5.39	5.92	4.31
(D)0	4.67	4.71	5.89	5.79	5.15
(DP)0	5.14	5.33	5.53	6.11	5.45
(DP)D2	5.76	6.64	5.89	6.41	6.09
(DP)D2P1	6.07	5.78	6.79	5.90	6.12
(DP)P1	6.05	6.77	5.91	5.69	6.09
(DP)P2	5.91	6.10	5.72	5.89	5.91
(DP52)0	5.93	5.91	5.38	5.65	5.76
Mean	5.29	5.74	5.81	5.92	5.61

Mean D.M. % 77.5

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73/R/RN/1 and 73/R/RN/2

LEY/ARABLE

Object: To study the effects of three-year leys on the fertility of the soil as measured by a sequence of three arable test crops. Since 1968, continuous wheat has been grown after the three test crops to study the build-up and decline of take-all (Gaeumannomyces graminis) after the different cropping sequences - Highfield and Fosters.

Sponsors: A.E. Johnston, D.B. Slope.

The 25th year, old grass, leys, potatoes, wheat.

For previous years see 'Details' 1967, 68/R/1(t), 69/R/RN/1&2(t), 70/R/RN/1&2(t), 71/R/RN/1&2(t) and 72/R/RN/1&2.

The experiment is duplicated on:-

A site with much organic matter initially (ploughed out from permanent grass) — HIGHFIELD

A site with little organic matter initially — FOSTERS

Treatments: The experiment originally tested four six-course rotations, with all phases present each year. In recent years these rotations were:- — ROTATION

Treatment crops	Test crops	
LU, LU, LU,	W, P, B	Lucerne
LC, LC, LC,	W, P, B	GloGra
LN, LN, LN,	W, P, B	Grass
H, SB, O,	W, P, B	Arable

LU = lucerne, LC = clover/grass ley, no nitrogen fertiliser, LN = all grass ley with much nitrogen fertiliser, H = 1 year seeds hay, SB = sugar beet, O = oats, W = wheat, P = potatoes, B = barley.

In 1968 the order of test crops was changed to P, W, B except for those phases that had already started the sequence W, P, B.

On both fields in the first three years other plots were sown with longer-term reseeded grass — Reseeded

On Highfield plots of the old turf were left initially unploughed, for comparison with the three-year leys — OldGrass

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73/R/RN/1 and 73/R/RN/2

In 1962 and 1963 some of the old and reseeded grass plots were divided for management identical to:- Clover/grass ley — C
All grass ley — N

From 1963 (reseeded) and 1968 (old grass) some grass plots were ploughed and cropped with the same test crops as above thereafter these plots followed the Arable rotation. In 1973 some of these plots were returned to reseeded grass.

From 1968 only two phases on each field have continued in the original six-course rotation. All other phases have been sown to wheat every year at the end of the test-crop cycle. In 1973:-

Wheat, 5th test crop, 4th cereal (P,W,B,W,W)	CEREAL4
Wheat, 6th test crop, 5th cereal (P,W,B,W,W,W)	CEREAL5
Wheat, 8th test crop, 6th cereal (W,P,B,W,W,W,W,W)	CEREAL6
Wheat, 9th test crop, 7th cereal (W,P,B,W,W,W,W,W,W)	CEREAL7

Treatments to wheat:-
Sub plots: Nitrogen fertiliser (kg N) in 1973: — N73

75	75
126	126
176	176
226	226

Treatments to potatoes:-
Sub plots: Farmyard manure residues, last applied 1968:- — FYMRES68

None	None
30 tonnes on each occasion	FYM

Sub sub plots: Nitrogen fertiliser (kg N):- — N73

None	0
80	80
160	160
240	240

Seed: Wheat: Cappelle sown at 200 kg.
Potatoes: King Edward, Rothamsted once grown
Hay: Perennial ryegrass S24 (64% by weight), Late flowering Red Clover S123 (29%), Canadian Alsike clover (7%). Mixture sown at 31 kg.

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73/R/RN/1 and 73/R/RN/2

All grass ley: Timothy S51 (45%), Meadow Fescue S215 (55%).
Mixture sown at 34 kg.
Clover/grass ley and reseeded grass (1973): Timothy S51 (42%),
Meadow Fescue S215 (50%), White Clover S100 (8%).
Mixture sown at 37 kg.

Cultivations, etc. (Highfield and Fosters):-

1st year treatment crops:

All grass ley: Ploughed: 15 Sept, 1972. Reploughed: 14 Nov. PK applied: 21 Mar, 1973. Seed sown: 29 Mar. N applied: 30 Mar. Sprayed with benazolin, 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 220 l): 31 May. Topped: 15 June. Cut once: 20 July. NK applied: 23 July.

Clover/grass ley: Ploughed: 15 Sept, 1972. Reploughed: 14 Nov. PK applied: 21 Mar, 1973. Seed sown: 28 Mar. Sprayed with benazolin, 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 220 l): 31 May. Topped: 15 June. Cut twice: 20 July and 13 Sept. K applied: 23 July.

Lucerne: Ploughed: 15 Sept, 1972. Reploughed: 14 Nov. PK applied: 21 Mar, 1973. Seed sown: 28 Mar. Sprayed with 2,4-DB and MCPA ('Embutox' at 8.4 l in 220 l): 4 June. Topped: 15 June. Cut: 30 July.

Hay: Ploughed: 15 Sept, 1972. PK applied: 18 Sept. Seed sown: 21 Sept. N applied: 21 Feb, 1973. Cut twice: 22 May and 26 June. NK applied after 1st cut.

1st Test Crop, Potatoes:

Ploughed: 14 Nov, 1972. PK applied: 6 Apr, 1973. N applied: 9 Apr. Rotary cultivated, potatoes planted: 10 Apr. Sprayed with linuron at 1.9 kg plus paraquat at 0.42 kg ion in 450 l: 12 May. Grubbed: 7 June. Rotary ridged: 9 June. Sprayed with mancozeb at 1.35 kg plus demeton-s-methyl at 0.25 kg in 370 l: 2 July. Sprayed with mancozeb at 1.35 kg in 370 l: 18 July and 9 Aug. Haulm destroyed mechanically: 14 Sept. Sprayed with undiluted BUV at 220 l: 20 Sept. Lifted: 26 Sept.

5th, 6th, 8th and 9th Test Crops. Wheat:

Ploughed: 15 Sept, 1972. Seed sown: 23 Oct. N applied, sprayed with dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l): 16 Apr, 1973. Combine harvested: 18 Aug.

Permanent Grasses:

The 25th experimental year: PK applied: 17 Nov, 1972. NK applied to 'all-grass' half plots, K to 'clover/grass' half plots: 21 Feb, 1973. Cut 4 times: 22 May, 16 June, 8 Aug, 13 Sept. NK applied to 'all-grass' half plots and K to clover/grass half plots after each cut except the last. Resown plots (reseeded in 1973) ('all-grass' and 'clover/grass'). Ploughed: 15 Sept, 1972. Reploughed: 14 Nov. PK applied: 21 Mar, 1973. Seed sown: 28 Mar. Sprayed with benazolin 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 220 l): 31 May. Topped: 15 June. Cut twice: 20 July, 13 Sept. NK and K applied after first cut.

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73/R/RM/1 and 73/R/RM/2

Standard errors per plot.

Potatoes, total tubers, tonnes/hectare:			
1st Test Crop:	H.	Sub plot:	3.22 or 6.4% (28 d.f.)
1st Test Crop:	F.	Sub plot:	2.59 or 5.4% (28 d.f.)
Wheat, Grain, tonnes/hectare:			
5th Test Crop:	H.	Whole plot:	0.239 or 4.6% (5 d.f.)
		Sub plot:	0.336 or 6.5% (18 d.f.)
	F.	Whole plot:	0.191 or 3.2% (4 d.f.)
		Sub plot:	0.366 or 6.1% (15 d.f.)
6th Test Crop:	H.	Whole plot:	0.144 or 2.6% (5 d.f.)
		Sub plot:	0.292 or 5.2% (18 d.f.)
	F.	Whole plot:	0.260 or 4.6% (4 d.f.)
		Sub plot:	0.470 or 8.2% (15 d.f.)
8th Test Crop:	H.	Whole plot:	0.557 or 9.7% (5 d.f.)
		Sub plot:	0.458 or 8.0% (18 d.f.)
	F.	Whole plot:	0.289 or 4.9% (4 d.f.)
		Sub plot:	0.486 or 8.3% (15 d.f.)
9th Test Crop:	H.	Whole plot:	0.521 or 9.0% (5 d.f.)
		Sub plot:	0.429 or 7.4% (18 d.f.)
	F.	Whole plot:	0.205 or 3.3% (4 d.f.)
		Sub plot:	0.276 or 4.5% (15 d.f.)

H = Highfield F = Fosters

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73/R/RH/1 and 73/R/RH/2

POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

HIGHFIELD

	ROTATION				N73				
	Lucerne	CloGra	Grass	Arable	0	80	160	240	Mean
FYMRES68									
None	49.2	47.0	50.1	52.7	45.9	48.7	51.7	52.6	49.7
FYM	50.1	54.3	47.5	49.5	49.3	52.3	49.7	50.1	50.4
				ROTATION					
				Lucerne	48.0	48.9	54.2	47.5	49.7
				CloGra	48.3	53.3	49.1	51.8	50.6
				Grass	47.5	48.0	49.7	49.9	48.8
				Arable	46.7	51.7	50.0	56.0	51.1
Mean					47.6	50.5	50.7	51.3	50.0

FYMRES68	None				FYM			
N73	0	80	160	240	0	80	160	240
ROTATION								
Lucerne	46.3	47.1	52.8	50.4	49.7	50.7	55.6	44.7
CloGra	44.2	48.4	46.6	48.7	52.4	58.3	51.6	55.0
Grass	47.2	47.4	53.8	51.9	47.9	48.6	45.6	48.0
Arable	45.9	51.8	53.8	59.3	47.4	51.7	46.2	52.7

STANDARD ERRORS OF DIFFERENCES

FYMRES68	N73	ROTATION* FYMRES68	ROTATION* N73	FYMRES68 N73	ROTATION* FYMRES68 N73
0.80	1.14	1.61	2.27	1.61	3.28

* Within the same level of ROTATION only

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73/R/RN/1 and 73/R/RN/2

POTATOES 1ST TEST CROP

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

HIGHFIELD

	ROTATION				N73				
	Lucerne	CloGra	Grass	Arable	0	80	160	240	Mean
FYMRES68									
None	91.4	90.1	91.9	92.1	89.7	90.6	92.2	93.1	91.4
FYM	91.5	92.9	91.1	91.3	91.4	91.7	92.6	91.1	91.7
				ROTATION					
				Lucerne	90.7	91.2	92.9	90.9	91.5
				CloGra	91.9	91.1	91.6	91.4	91.5
				Grass	91.1	91.0	91.6	92.5	91.5
				Arable	88.6	91.1	93.5	93.5	91.7
Mean					90.6	91.1	92.4	92.1	91.5

FYMRES68	None				FYM			
N73	0	80	160	240	0	80	160	240
ROTATION								
Lucerne	90.2	90.5	92.8	92.2	91.2	91.9	93.1	89.7
CloGra	89.5	89.5	90.0	91.4	94.2	92.8	93.1	91.3
Grass	89.6	91.2	92.1	94.9	92.6	90.7	91.1	90.1
Arable	89.6	91.1	93.8	93.7	87.6	91.1	93.2	93.3

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73/R/RN/1 and 73/R/RN/2

POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

FOSTERS

	ROTATION				N73				
	Lucerne	CloGra	Grass	Arable	0	80	160	240	Mean
FYMRES68									
None	49.0	47.7	44.9	45.4	40.4	47.2	48.3	51.3	46.8
FYM	51.1	51.4	47.9	43.8	43.8	48.6	51.5	50.3	48.5
				ROTATION					
				Lucerne	44.5	49.5	54.1	52.3	50.1
				CloGra	46.5	50.0	51.2	50.5	49.5
				Grass	40.2	46.1	48.5	50.8	46.4
				Arable	37.2	46.0	45.7	49.5	44.6
Mean					42.1	47.9	49.9	50.8	47.7

FYMRES68	None				FYM			
N73	0	80	160	240	0	80	160	240
ROTATION								
Lucerne	42.7	47.7	51.4	54.4	46.2	51.3	56.8	50.2
CloGra	44.4	49.0	48.3	49.1	48.5	50.9	54.1	51.9
Grass	37.1	45.0	46.3	51.3	43.4	47.2	50.8	50.2
Arable	37.2	47.1	47.2	50.2	37.2	44.9	44.3	48.8

STANDARD ERRORS OF DIFFERENCES

ROTATION	FYMRES68	N73	ROTATION* FYMRES68	ROTATION* N73	FYMRES68 N73	ROTATION FYMRES68 N73
1.57	0.65	0.91	1.29	1.83	1.29	2.88
Except when comparing means with same level of						
ROTATION			1.29	1.83		2.59
ROTATION.FYMRES68						2.59
ROTATION.N73						2.59

* Within the same level of ROTATION only

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73/R/RN/1 and 73/R/RN/2

POTATOES 1ST TEST CROP

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

FOSTERS

	ROTATION				N73				
	Lucerne	CloGra	Grass	Arable	0	80	160	240	Mean
FYMRES68									
None	93.2	93.6	92.7	92.3	90.5	92.8	93.9	94.6	92.9
FYM	93.3	93.4	92.6	91.6	91.1	92.2	93.5	94.0	92.7
				ROTATION					
				Lucerne	90.8	93.6	94.3	94.3	93.2
				CloGra	94.4	92.6	93.5	93.3	93.5
				Grass	89.3	93.1	93.6	94.5	92.6
				Arable	88.9	90.5	93.3	95.1	91.9
Mean					90.8	92.5	93.7	94.3	92.8

FYMRES68	None				FYM			
N73	0	80	160	240	0	80	160	240
ROTATION								
Lucerne	90.2	93.8	93.8	95.0	91.3	93.4	94.7	93.6
CloGra	94.5	92.4	94.2	93.2	94.3	92.9	92.8	93.5
Grass	88.3	93.6	93.8	95.0	90.3	92.5	93.4	94.0
Arable	89.1	91.3	93.7	95.1	88.6	89.8	93.0	95.1

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73/R/RN/1 and 73/R/RN/2

WHEAT 5TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

	N73 75	126	176	226	Mean
ROTATION					
Lucerne	5.92	4.76	4.99	4.22	4.97
CloGra	5.56	5.06	5.09	4.94	5.16
Grass	5.60	5.66	5.25	4.71	5.30
Arable	6.02	5.65	6.15	5.63	5.86
Reseeded	5.54	5.57	5.20	5.05	5.34
OldGrass	5.36	4.61	4.17	4.04	4.55
Mean	5.67	5.22	5.14	4.76	5.20

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.239	0.137	0.376

Except when comparing means with same level of ROTATION 0.336

Mean D.M. % 86.3

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73/R/RN/1 and 73/R/RN/2

WHEAT 5TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

	N73 75	126	176	226	Mean
ROTATION					
Lucerne	5.60	5.99	5.82	5.57	5.75
CloGra	7.13	6.57	5.55	5.46	6.18
Grass	6.58	6.60	5.54	5.12	5.96
Arable	6.54	6.81	6.20	5.26	6.21
Reseeded	6.33	6.32	5.51	5.39	5.89
Mean	6.44	6.46	5.73	5.36	6.00

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.191	0.164	0.370

Mean D.M. % 85.8

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73/R/RN/1 and 73/R/RN/2

WHEAT 6TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

	N73				
	75	126	176	226	Mean
ROTATION					
Lucerne	6.75	5.97	5.81	5.51	6.01
CloGra	6.35	5.48	5.64	5.16	5.66
Grass	6.27	6.23	5.34	4.96	5.70
Arable	6.70	6.32	5.27	5.01	5.83
Reseeded	6.21	5.54	4.91	4.63	5.32
OldGrass	5.78	5.07	4.98	4.80	5.16
Mean	6.34	5.77	5.32	5.01	5.61

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.144	0.119	0.291

Mean D.M. % 86.8

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73/R/RN/1 and 73/R/RM/2

WHEAT 6TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

	N73				
	75	126	176	226	Mean
ROTATION					
Lucerne	6.14	6.04	5.46	5.14	5.69
CloGra	5.93	6.28	5.59	5.35	5.79
Grass	6.18	6.27	5.71	4.96	5.78
Arable	5.61	6.50	6.09	5.59	5.95
Receeded	5.63	5.80	5.22	4.55	5.30
Mean	5.90	6.18	5.61	5.12	5.70

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.260	0.210	0.483
Except when comparing means with same level of ROTATION		0.470

Mean D.M. % 87.2

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73/R/RN/1 and 73/R/RN/2

WHEAT 8TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

	N73 75	126	176	226	Mean
ROTATION					
Lucerne	6.06	6.71	5.77	5.71	6.06
CloGra	5.57	5.29	5.55	4.50	5.23
Grass	6.07	6.32	6.00	5.79	6.05
Arable	6.31	6.72	6.27	5.96	6.32
Reseeded	5.75	5.37	5.16	4.73	5.25
OldGrass	6.40	6.03	5.11	4.98	5.63
Mean	6.03	6.07	5.64	5.28	5.76

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.557	0.187	0.684
Except when comparing means with same level of ROTATION		0.458

Mean D.M. % 85.8

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73/R/RH/1 and 73/R/RH/2

WHEAT 8TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

	N73 75	126	176	226	Mean
ROTATION					
Lucerne	5.52	6.48	5.85	5.81	5.91
CloGra	6.07	6.60	6.02	5.21	5.98
Grass	5.92	6.48	6.06	5.31	5.94
Arable	5.92	6.67	6.38	5.64	6.15
Reseeded	5.15	5.82	5.21	5.33	5.38
Mean	5.72	6.41	5.90	5.46	5.87

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.289	0.217	0.511
Except when comparing means with same level of ROTATION		0.486

Mean D.M. % 86.0

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73/R/RN/1 and 73/R/RN/2

WHEAT 9TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

	N73 75	126	176	226	Mean
ROTATION					
Lucerne	5.84	5.86	6.16	5.29	5.79
CloGra.	6.19	5.86	5.72	5.31	5.77
Grass	6.25	6.24	5.24	5.02	5.69
Arable	5.99	6.39	6.10	5.82	6.08
Reseeded	6.83	6.02	5.50	5.50	5.96
OldGrass	6.21	5.55	5.30	5.13	5.55
Mean	6.22	5.99	5.67	5.35	5.81

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.521	0.175	0.640
Except when comparing means with same level of ROTATION		0.429

Mean D.M. % 86.4

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73/R/RN/1 and 73/R/RN/2

WHEAT 9TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

	N73				
	75	126	176	226	Mean
ROTATION					
Lucerne	6.31	6.74	6.49	5.91	6.36
CloGra	6.36	6.47	5.98	5.54	6.09
Grass	6.04	6.60	6.02	5.26	5.98
Arable	5.92	6.62	6.16	5.68	6.09
Reseeded	6.48	6.36	5.97	5.34	6.04
Mean	6.22	6.56	6.12	5.55	6.11

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.205	0.123	0.314
Except when comparing means with same level of ROTATION		0.276

Mean D.M. % 87.2

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73/R/RM/1 and 73/R/RM/2

HAY, DRY MATTER: TONNES/HECTARE

	1st cut	2nd cut	3rd cut	4th cut	Total
		HIGHFIELD			
	4.74	1.40	3.08	1.09	10.31

Mean D.M. %
1st cut: 15.2
2nd cut: 20.3
3rd cut: 17.1
4th cut: 27.1
Total of 4 cuts: 19.9

		FOSTERS			
	3.62	2.01	3.16	0.74	9.53

Mean D.M. %
1st cut: 14.6
2nd cut: 19.0
3rd cut: 19.6
4th cut: 33.1
Total of 4 cuts: 21.6

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73/R/RN/1 and 73/R/RN/2

	HIGHFIELD Mean	FOSTERS Mean
LUCERNE, DRY MATTER: TONNES/HECTARE		
TOTAL OF 2 CUTS		
1st year	6.60	5.66
ALL-GRASS LEY, DRY MATTER: TONNES/HECTARE		
TOTAL OF 2 CUTS		
1st year	5.98	4.52
CLOVER/GRASS LEY, DRY MATTER: TONNES/HECTARE		
1st year	4.85	3.73

RESEEDED GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

	Blocks	HIGHFIELD RC	HIGHFIELD RN	Blocks	FOSTERS RC	FOSTERS RN
25th Exptl year	1 & 4	4.49	9.33	1 & 3	5.92	8.86
25th Exptl year (Reseeded 1973)	2 & 3	4.84	5.79	2 & 4	3.68	5.26

PERMANENT GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

	GC	GN
	HIGHFIELD	
25th Exptl year		
Blocks 1 & 4	3.59	9.50
Block 2	4.37	8.82

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73/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without three-year leys. The effects of the cropping systems on soil-borne pathogens are also studied - Woburn Stackyard D.

Sponsors: D.A. Boyd, J.M. Hirst, A.E. Johnston, F.G.W. Jones.

The 36th year, leys, potatoes, barley, wheat.

For previous years see 'Details' 1967, 68/B/2(t), 69/W/RN/3(t), 70/W/RN/3(t), 71/W/RN/3(t) and 72/W/RN/3(t).

Design: 5 series of 8 plots, split for treatments other than rotations.

Whole plot dimensions: 8.53 x 40.7. Areas harvested: Wheat, 0.00260, Barley, 1st treatment crop: 0.00570, 3rd treatment crop: 0.00601, Potatoes, 1st treatment crop: 0.00130, 1st test crop (Ley and Sainfoin): 0.00260, 1st test crop (Arable and Arable H): 0.00130.

Treatments: All phases of four five-course rotations are present:

		ROTATION
Grass/clover ley:	L, L, L, P, W	Ley
All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W	Sainfoin Clover
Arable:	P, R, C, P, W until 1971 then P, B, B, P, W	Arable
Arable with hay:	**P, R, H, P, W until 1971 then P, B, H, P, W**	**Arable H**

P = potatoes, R = rye, C = carrots, W = wheat, B = barley, H = hay, L = grass/clover ley, SA = sainfoin ley, CL = red clover ley

Additional treatments to first test crop, potatoes:-

1/2 plots:	1. Farmyard manure residues, last applied 1963:	FYMRES63
	None	None
	38 tonnes on each occasion	FYM
1/4 plots (AH, A rotations only)	2. Fumigant residues, applied 1970:	FUMRES70
	None	None
	Chloropicrin, 448 kg	Chlorop

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1/4 plots (L,S) 1/8 plots (A, AH)	3. Fumigant applied in 1973:-	FUM73
	None	None
	Chloropicrin, 448 kg, plus aldicarb, 6.7 kg	Chlor/al

Additional treatments to second test crop, winter wheat:-

1/2 plots	1. Farmyard manure residues, last applied 1967:-	FYMRES67
	None	None
	38 tonnes on each occasion	FYM
1/4 plots (A,AH only)	2. Fumigant residues, applied 1969:-	FUMRES69
	None	None
	Chloropicrin, 448 kg	Chlorop
1/4 plots (L,S) 1/8 plots (A,AH)	3. Fumigant residues, applied 1972:-	FUMRES72
	None	None
	Chloropicrin, 448 kg, plus aldicarb, 11 kg	Chlor/al
1/8 plots	4. Nitrogen fertiliser (kg N) in 1973:-	N73
	None	0
	63	63
	126	126
	189	189

Additional treatments to first treatment crop, potatoes:-

1/2 plots	1. Farmyard manure residues, last applied 1966:-	FYMRES66
	None	None
	38 tonnes on each occasion	FYM
1/8 plots	2. Fumigant residues, applied 1971:-	FUMRES71
	None	None
	Chloropicrin, 448 kg, plus aldicarb, 11 kg	Chlor/al
1/4 plots	3. Fumigant applied in 1973:-	FUM73
	None	None
	Chloropicrin, 448 kg, plus aldicarb, 6.7 kg	Chlor/al

NOTE: Chloropicrin was applied to plots 35, 36, 47 and 48 on 1/4 plots in error.

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Additional treatments to second treatment crop, barley:-

1/2 plots	1. Farmyard manure residues, last applied 1965:-	FYMRES65
	None	None
	38 tonnes on each occasion	FYM
1/4 plots	2. Fumigant residues, applied 1972:-	FUMRES72
	None	None
	Chloropicrin, 448 kg, plus aldicarb 5.6 kg	Chlor/al

Additional treatments to third treatment crop, barley:-

1/2 plots	1. Farmyard manure residues, last applied 1964:-	FYMRES64
	None	None
	38 tonnes on each occasion	FYM

Corrective K dressings (in kg K2O) as muriate of potash applied to first test crop, potatoes:-

	No FYM half plots	FYM half plots
Continuous rotations		
Ley	502	502
Clover	126	126
Arable with hay	314	376
Arable	439	439
Alternating rotations (last two rotations in order)		
Ley/arable	439	439
Sainfoin/arable with hay	439	502
Arable/ley	502	502
Arable with hay/clover	251	0

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

Standard applications:-

Winter wheat: Manures: (0:20:20) at 300 kg. Magnesian limestone at 5 tonnes. Weedkillers: Paraquat at 0.56 kg ion in 280 l. Ioxynil at 0.52 kg plus mecoprop at 1.58 kg in 280 l.

Barley: Manure: (15:15:15) at 410 kg. Weedkiller: Ioxynil at 0.52 kg plus mecoprop at 1.6 kg in 280 l.

Potatoes, treatment and test crop: Manures: (13:13:20) at 1940 kg. Weedkiller: Linuron at 1.7 kg in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

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Hay: Manures: Nitrogen at 130 kg as 'Nitro-Chalk' plus (0:14:28) at 540 kg in spring, and (25:0:16) at 270 kg after the first cut.
Ley, 1st year: Manures: Nitrogen at 50 kg as 'Nitro-Chalk', P205 at 190 kg as superphosphate, K20 at 130 kg as muriate of potash in the seedbed. (25:0:16) at 360 kg divided between two equal applications. Weedkiller: Benazolin with 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 280 l).
Leys, 2nd and 3rd yeas: Manures: (25:0:16) at 540 kg in three equal applications.
Clover 1st year: Manures: Nitrogen at 60 kg as 'Nitro-Chalk', P205 at 190 kg as superphosphate, K20 at 130 kg as muriate of potash. Weedkiller: Benazolin with 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 280 l).
Clover, 2nd and 3rd years: Nitrogen at 60 kg as 'Nitro-Chalk', K20 at 190 kg as muriate of potash.

Varieties: Winter wheat: Cappelle, sown at 200 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.
Potatoes: first test crop and treatment crop: Maris Piper.
Red clover: S123, sown at 45 kg.
Ley: Perennial ryegrass S23, Cocksfoot S143, late flowering red clover, Alsike clover, sown at 30 kg.

Cultivations, etc.:- Treatment crops:
Ley, 1st year: Deep-tine cultivated twice: 11 Sept, 1972, 18 Sept. Ploughed: 2 Feb, 1973. Chloropicrin applied in error to plots in alternating rotation: 7 Feb. N, P and K applied, seeds sown: 20 Mar. Weedkiller applied: 31 Mar. NK applied: 19 June. Cut once: 2 Aug. NK applied: 16 Aug.
Ley, 2nd year: NK applied: 9 Mar, 1973, 2 July, 16 Aug. Cut twice: 23 June, 13 Aug.
Ley, 3rd year: NK applied: 9 Mar, 1973, 18 June, 16 Aug. Cut three times: 12 June, 2 Aug, 5 Nov.
Clover, 1st year: Deep-tine cultivated twice: 11 Sept, 1972, 18 Sept. Ploughed: 2 Feb, 1973. Chloropicrin applied in error to plots in alternating rotation: 7 Feb. N, P and K applied, rolled, seed sown: 20 Mar. Weedkiller applied: 31 May. Cut: 2 Aug.
Clover, 2nd year: N applied: 9 Mar, 1973. K applied: 15 Mar. Cut twice: 23 June, 13 Aug.
Clover, 3rd year: NK applied: 9 Mar, 1973. Cut twice: 12 June, 2 Aug.
Potatoes, 1st treatment crop: Deep-tine cultivated twice: 11 Sept, 1972, 18 Sept. Ploughed: 2 Feb, 1973. Chloropicrin applied to continuous arable with hay plots: 7 Feb. Chloropicrin applied to plots in alternating rotations, previously omitted in error: 8 Mar. NPK applied, rotary cultivated: 9 Apr. Aldicarb applied: 16 Apr. Rotary cultivated,

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potatoes planted: 17 Apr. Weedkiller applied: 12 May. Grubbed: 1 June. Rotary ridged: 4 June. Fungicide with insecticide applied: 5 July. Fungicide applied twice: 26 July, 13 Aug. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 3 Oct.

Barley 2nd treatment crop: Deep-tine cultivated: 28 Sept, 1972. Spring-tine cultivated with crumbler: 9 Mar, 1973. Seed sown: 12 Mar. Seeds hay undersown (AH plots): 15 Mar. Weedkiller applied to plots not undersown: 11 May. Combine harvested: 13 Aug.

Barley, 3rd treatment crop: Deep-tine cultivated: 28 Sept, 1972. Ploughed: 29 Dec. Spring-tine cultivated with crumbler: 9 Mar. Seed sown: 12 Mar, 1973. Weedkiller applied: 11 May. Combine harvested: 13 Aug.

Seeds Hay: Seeds undersown in barley: 26 Apr, 1972. N, P and K applied: 9 Mar, 1973. Cut twice: 12 June, 2 Aug. NK applied: 19 June.

Test Crops:

Potatoes, 1st test crop: Ploughed: 20 Sept, 1972. First half corrective K applied: 6 Oct. Second half corrective K applied: 1 Feb, 1973. Chloropicrin applied: 7 Feb. NPK applied: 26 Mar. Deep-tine cultivated: 5 Apr. Aldicarb applied, all plots rotary cultivated, potatoes planted: 9 Apr. Weedkiller applied: 12 May. Grubbed: 1 June. Rotary ridged: 4 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 2 Oct.

Wheat, 2nd test crop: Deep-tine cultivated: 30 Sept, 1972. Magnesian limestone applied: 7 Oct. Seed sown: 20 Oct. Paraquat applied: 17 Nov. Seed resown because varieties mixed at first sowing: 24 Nov. N applied: 16 Apr, 1973. Ioxynil and mecoprop applied: 11 May. Combine harvested: 24 Aug.

NOTE: Soil samples were taken from the potato plots monthly throughout the growing season for counts of nematodes.

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73/W/RN/3

TABLES OF MEANS

POTATOES 1ST TEST CROP

	ROTATION Ley	Sainfoin	Mean	ROTATION Arable	Arable H	Mean
	TOTAL TUBERS: TONNES/HECTARE					
FYMRES63						
None	58.5	55.5	57.0	54.4	56.5	55.4
FYM	61.0	58.1	59.5	57.4	58.1	57.7
FUM73						
None	57.9	52.4	55.2	55.2	54.4	54.8
Chlor/al	61.5	61.1	56.8	56.6	60.1	58.4
FUMRES70						
None				55.2	54.7	55.0
Chlorop				56.5	59.9	58.2
Mean	59.7	56.8	58.3	55.9	57.3	56.6
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE					
FYMRES63						
None	95.2	94.1	94.6	94.5	94.7	94.6
FYM	95.9	93.2	94.5	95.0	94.6	94.8
FUM73						
None	96.0	94.0	95.0	95.0	94.5	94.7
Chlor/al	95.0	93.2	94.1	94.6	94.8	94.7
FUMRES70						
None				95.4	94.4	94.9
Chlorop				94.1	94.9	94.5
Mean	95.5	93.6	94.6	94.8	94.7	94.7

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73/W/RN/3

WHEAT 2ND TEST CROP

GRAIN: TONNES/HECTARE

	ROTATION			ROTATION		
	Ley	Sainfoin	Mean	Arable	Arable H	Mean
N73						
0	5.17	4.59	4.88	4.91	5.16	5.03
63	4.77	4.19	4.48	4.64	4.75	4.70
126	3.84	3.38	3.61	4.00	4.06	4.03
189	3.16	2.76	2.96	3.28	3.47	3.37
FYMRES67						
None	4.22	3.76	3.99	4.22	4.34	4.28
FYM	4.25	3.70	3.98	4.19	4.37	4.28
FUMRES72						
None	4.32	3.77	4.04	4.39	4.41	4.40
Chlor/al	4.15	3.69	3.92	4.02	4.31	4.17
FUMRES69						
None				4.20	4.31	4.25
Chlorop				4.22	4.41	4.31
Mean	4.24	3.73	3.98	4.21	4.36	4.28

Mean D.M. % 84.8

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73/W/RM/3

WHEAT 2ND TEST CROP

STRAW: TONNES/HECTARE

	ROTATION			ROTATION		
	Ley	Sainfoin	Mean	Arable	Arable H	Mean
N73						
0	4.75	4.11	4.43	4.44	4.69	4.57
63	5.33	4.37	4.85	5.16	4.76	4.96
126	5.23	4.90	5.06	5.43	5.11	5.27
189	5.22	5.16	5.19	4.76	5.09	4.93
FYMRES67						
None	5.01	4.60	4.80	5.14	4.78	4.96
FYM	5.25	4.67	4.96	4.76	5.05	4.90
FUMRES72						
None	4.92	4.70	4.81	5.18	5.00	5.09
Chlor/al	5.35	4.57	4.96	4.72	4.83	4.77
FUMRES69						
None				5.13	4.93	5.03
Chlorop				4.77	4.90	4.83
Mean	5.13	4.64	4.88	4.95	4.91	4.93

Mean D.M. % 81.2

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POTATOES 1ST TREATMENT CROP

ROTATION

	Ley	Sainfoin	Arable H	Arable	Mean
	TOTAL TUBERS: TONNES/HECTARE				
FYMRES66					
None	52.5	53.0	51.2	52.1	52.2
FYM	59.8	56.4	58.4	53.0	56.9
FUMRES71					
None	55.5	54.1	52.5	50.1	53.1
Chlor/al	56.8	55.3	57.1	55.0	56.1
FUM73					
None	55.8	53.1	50.3	47.3	51.6
Chlor/al	56.5	56.3	59.4	57.9	57.5
None	56.2	54.7	54.8	52.6	54.6
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
FYMRES66					
None	92.3	93.5	94.9	94.2	93.7
FYM	93.8	92.7	94.4	93.5	93.6
FUMRES71					
None	92.9	93.4	94.7	93.0	93.5
Chlor/al	93.1	92.9	94.6	94.7	93.8
FUM73					
None	93.1	92.9	94.4	93.0	93.3
Chlor/al	92.9	93.4	94.9	94.7	94.0
Mean	93.0	93.1	94.6	93.9	93.7

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BARLEY 2ND TREATMENT CROP

ROTATION

	Arable	Arable H	Ley	Sainfoin	Mean
	GRAIN: TONNES/HECTARE				
FYMRES65					
None	3.61	3.97	4.73	5.31	4.40
FYM	4.18	4.47	5.19	5.07	4.73
FUMRES72					
None	3.22	3.32	4.56	4.98	4.02
Chlor/al	4.58	5.12	5.36	5.40	5.11
Mean	3.90	4.22	4.96	5.19	4.57
	STRAW: TONNES/HECTARE				
FYMRES65					
None	2.30	3.45	3.11	3.86	3.18
FYM	2.77	3.23	3.90	3.73	3.41
FUMRES72					
None	2.21	3.03	3.03	3.75	3.01
Chlor/al	2.86	3.65	3.98	3.84	3.58
Mean	2.53	3.34	3.51	3.80	3.29

Mean D.M. % Grain: 83.0
Straw: 92.9

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73/M/RN/3

BARLEY 3RD TREATMENT CROP

ROTATION

	Arable	Sainfoin	Mean
	GRAIN: TONNES/HECTARE		
FYMRES64			
None	2.32	3.89	3.11
FYM	2.58	4.21	3.40
Mean	2.45	4.05	3.25
	STRAW: TONNES/HECTARE		
FYMRES64			
None	1.43	2.56	2.00
FYM	1.50	2.80	2.15
Mean	1.47	2.68	2.07

Mean D.M. % Grain 82.6
Straw 92.1

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73/W/RN/4

MARKET GARDEN

Object: To study the residual effects of phosphate, applied either as fertiliser or in organic manures in the period 1942-67, on yields of crops grown in rotation - Woburn Lansome I.

Sponsor: A.E. Johnston.

The fourth year of revised scheme, barley.

For previous years see 'Details' 1967, 68/B/4(t), 69/W/RN/4, 70/W/RN/4(t), 71/W/RN/4(t) and 72/W/RN/4(t).

Design: 2 series each of 40 plots divided into 4 blocks of 10 plots. Series B has the plots split into 2.

Whole plot dimensions: 8.53 x 5.18.

Basal applications: Manures: 70 kg N as 'Nitro-Chalk' combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 280 l.

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Series A: Deep-tine cultivated: 27 Oct, 1972. Ploughed: 20 Dec. Seed sown: 12 Mar, 1973. Weedkiller applied: 27 Apr. Combine harvested: 9 Aug.
Series B: Ploughed: 19 Dec, 1972. Seed sown: 12 Mar, 1973. Weedkiller applied: 27 Apr. Combine harvested: 9 Aug.

NOTES: (1) No fresh treatments were applied in 1973.
(2) Yields were not taken because of severe damage by birds.

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73/R/RN/5

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Great Field IV.

Sponsor: F.V. Widdowson.

The eighteenth year of the rotation, barley, ley, potatoes, winter wheat, kale. The fourteenth year of the same rotation on the additional plots. The seventeenth year of permanent grass.

For previous years see 58/Bc/1(t), 59/Bc/1(t), 60/B/3(t), 61-64/B/2, 65/B/2(t), 66/B/2(t), 67/B/2, 68/B/3(t), 69-72/R/RN/5.

Treatments: Fertilisers and farmyard manure:-

Original plots:

	MANURE
None	0
N1	N1
P	P
N1 P	N1P
K	K
N1 K	N1K
PK	PK
N1 PK	N1PK
N2 PK	N2PK
D	D
N1 PK D	N1PKD
N2 PK D	N2PKD

N1, 2 (kg N): 19, 38 (ley): 56, 112 (barley): 75, 150 (wheat and potatoes): 125, 250 (kale and permanent grass) as 'Nitro-Chalk'

P: 63 kg P_2O_5 as superphosphate

K: 250 kg K_2O as muriate of potash

D: 38 tonnes FYM (permanent grass): 50 tonnes (kale and potatoes): none to other crops.

Additional plots:

	MANURE
None	0
N2 PK	F
N2 PK Mg Ca	FMgCa
N2 PK Mg S	FMgS
N2 PK Ca S	FCaS
N2 PK Mg Ca S	FMgCaS
N2 PK Mg Ca S TE	FMgCaSTE

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N2: rates as above, applied as urea
P: 126 kg P_2O_5 as potassium dihydrogen phosphate
K: 83 kg K_2O as potassium sulphate to S plots: 93 kg K_2O as potassium chloride to the remainder
Mg: 126 kg MgO as magnesium chloride
Ca: 126 kg CaO as calcium carbonate
S: 30 kg S supplied by potassium sulphate
TE: Trace element mixture including Mn, Cu, Zn, B, Mo, Co, Fe. Test varies with crop

Whole plot dimensions: 2.13 x 2.44.

Standard applications:
Winter wheat: Weedkiller: 2,4D-P plus MCPA ('Mephetol plus' at 5.6 l in 900 l).
Kale: Insecticide: Menazon ('Saphi-Col' at 0.7 l in 340 l).
Barley: Weedkiller: 2,4D-P plus MCPA ('Mephetol plus' at 5.6 l in 450 l). Fungicide: Tridemorph at 0.53 kg in 450 l (not applied to additional plots).
Potatoes: Insecticide: Menazon ('Saphi-Col' at 0.7 l in 340 l) applied on three occasions. Fungicide: Mancozeb at 1.3 kg applied with insecticide on the last two occasions.

Seed:
Winter wheat: Maris Nimrod, sown at 270 kg.
Kale: Thousand Headed.
Barley: Deba Abed sown at 200 kg. (Midas on additional plots, seed dressed with ethirimol).
Grass-clover ley: R.V.P. Italian Ryegrass and Hungaropoly Red Clover.
Potatoes: King Edward.

Cultivations etc.:-
Winter wheat: Plots dug by hand: 25 Sept, 1972. PK Mg Ca and S applied, seed sown: 13 Oct. First half N dressing applied: 16 Mar, 1973. Weedkiller applied: 5 Apr. Trace element spray applied, second half N dressing applied, all N applied to additional plots: 17 Apr. Harvested: 13 Aug.
Kale: FYM applied, plots dug by hand: 13 Mar, 1972. PK, Mg, Ca and S applied: 27 Feb, 1973. Plots rotary cultivated, seed drilled: 20 Mar. First half N dressing applied to additional plots, all N to remainder: 25 Apr. Second half N dressing applied: 18 May. Trace element spray applied: 6 June. Insecticide applied: 14 June. Harvested: 12 Oct.

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Barley: Plots dug by hand: 13 Nov, 1972. PK, Mg, Ca and S applied: 27 Feb, 1973. N applied, plots rotary cultivated, seed sown: 12 Mar. Weedkiller applied: 11 Apr. Trace element spray and fungicide applied: 18 May. Harvested: 3 Aug.

Grass-clover ley: Seed sown in barley stubble, additional plots: 14 Aug, 1972, main experiment: 1 Sept. PK Mg Ca and S applied: 18 Dec. N applied: 16 Mar, 1973. Trace element spray applied: 17 Apr. Cut three times: 5 June, 16 July, 13 Sept.

Potatoes: FYM applied, plots dug by hand: 13 Nov, 1972. PK, Mg, Ca and S applied: 27 Feb, 1973. N applied, plots rotary cultivated twice and Mg applied to half plots of main experiment, potatoes planted: 29 Mar. Second half N dressing applied to additional plots: 18 May. Trace element spray applied: 6 June. Insecticide applied: 14 June. Insecticide with fungicide applied: 29 June and 18 July. Lifted: Plots of the main experiment with neither K nor FYM and no fertiliser plot of additional plots: 27 July. Remaining plots lifted: 4 Sept.

Permanent grass: P and K applied: 18 Dec, 1972. FYM applied: 27 Feb, 1973. N applied: 16 Mar, 18 May, 16 July. Cut three times: 18 May, 16 July, 27 Sept.

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TABLES OF MEANS

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

	WINTER WHEAT: GRAIN	STRAW	KALE: FRESH WEIGHT	BARLEY: GRAIN	STRAW	LEY: DRY MATTER 1st cut	2nd cut	3rd cut	Total of 3 cuts	POTATOES TOTAL TUBERS	PERMANENT GRASS: DRY MATTER 1st cut	2nd cut	3rd cut	Total of 3 cuts
MANURE														
0	3.27	4.42	18.3	2.91	2.76	1.95	0.69	0.94	3.58	12.3	0.42	1.26	0.98	2.66
N1	3.24	6.15	23.5	2.72	3.08	3.51	0.92	1.29	5.72	10.7	1.00	1.45	1.48	3.93
P	2.60	3.93	30.5	2.91	2.74	2.05	1.26	2.15	5.46	9.2	0.48	1.01	0.71	2.20
N1P	0.84	3.55	47.1	0.72	2.31	3.54	0.83	0.64	5.01	10.5	1.71	1.77	1.74	5.22
K	4.21	5.72	17.4	3.89	3.00	2.22	1.57	2.94	6.73	32.3	0.55	1.23	1.18	2.96
N1K	6.18	8.27	13.1	4.46	4.00	3.56	1.43	2.19	7.18	42.1	1.88	2.35	2.35	6.58
PK	4.67	6.14	25.3	4.25	3.29	2.56	2.80	4.11	9.47	35.0	0.63	1.64	1.18	3.45
N1PK	6.55	9.49	60.2	5.25	5.73	4.26	1.96	4.06	10.28	51.5	2.22	2.56	1.90	6.68
N2PK	6.72	10.56	81.1	5.68	6.68	5.28	1.38	3.09	9.75	57.7	4.04	3.16	2.70	9.90
D	6.13	8.46	49.7	5.45	4.60	3.57	2.49	4.11	10.17	56.7	2.62	1.91	1.50	6.03
N1PKD	6.20	10.99	106.4	5.88	6.60	4.46	1.65	3.99	10.10	65.0	3.45	2.73	2.25	8.43
N2PKD	4.74	12.36	109.0	4.84	6.74	5.65	1.58	3.25	10.48	70.9	4.86	3.66	2.55	11.07
Mean D.M. %	85.7	80.4		80.0	57.0	26.6	18.1	24.6	23.1		28.3	25.3	25.6	26.4

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73/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

	WINTER WHEAT:		KALE:	BARLEY:		LEY: DRY MATTER				POTATOES
	GRAIN	STRAW	FRESH WEIGHT	GRAIN	STRAW	1st cut	2nd cut	3rd cut	Total of 3 cuts	TOTAL TUBERS
MANURE										
0	3.81	5.34	25.3	3.75	3.25	2.04	1.42	1.77	5.23	15.9
F	6.19	9.71	92.4	5.73	6.92	6.16	1.80	2.96	10.92	55.2
FMgCa	6.49	10.93	90.7	7.01	7.45	6.61	1.59	2.99	11.19	51.1
FMgS	6.44	9.33	98.5	5.64	7.21	6.03	1.98	3.25	11.26	53.4
FCaS	5.91	10.54	87.2	6.33	7.58	7.04	2.20	3.34	12.58	51.1
FMgCaS	5.92	10.27	101.1	6.33	6.58	6.80	1.88	3.26	11.94	51.7
FMgCaSTE	5.88	10.79	89.8	5.71	6.85	6.90	1.83	3.02	11.75	47.1
Mean D.M. %	85.6	83.9		84.6	73.6	27.3	18.0	25.8	23.7	

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73/W/RN/6

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Woburn Stackyard C.

Sponsor: F.V. Widdowson.

The fourteenth year, oats, sugar beet, barley, ley, potatoes and old grass.

For previous years see 60/B/3(t), 61-65/B/2, 66/B/2(t), 67/B/2(t), 68/B/3(t), 69/W/RN/6, 70/W/RN/6(t) and 71-72/W/RN/6.

Design: 1 block of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: Fertilisers and farmyard manure:-

	MANURE
None	0
N1	N1
P	P
N1 P	N1P
K	K
N1 K	N1K
PK	PK
N1 PK	N1PK
N2 PK	N2PK
D	D
N1 PK D	N1PKD
N2 PK D	N2PKD

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.
P: P_2O_5 at 63 kg as triple superphosphate.
K: K_2O at 252 kg as potassium bicarbonate.
D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

Standard applications:
Winter oats: First weedkiller: Dichlorprop and MCPA ('Mephetol Plus' at 5.6 l in 450 l). Second weedkiller: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 450 l.
Sugar beet: Manures: Boron at 7.3 kg B_2O_3 as 0.8% solution of borax.
Insecticide: Menazon at 0.28 kg in 340 l on three occasions.

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Barley: Weedkiller: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 340 l.
Potatoes: Insecticide: Menazon at 0.28 kg in 340 l. Insecticide with fungicide: Menazon at 0.28 kg with mancozeb at 1.3 kg in 340 l on two occasions.
Old grass: Manures: Epsom salts at 500 kg.

Seed: Winter oats: Peniarth sown at 260 kg.
Sugar beet: Klein E sown at 5.6 kg.
Barley: Julia, dressed with ethirimol, sown at 180 kg.
Grass-clover ley: R.V.P Italian Ryegrass and Hungaropoly red clover.
Potatoes: Desiree.

Cultivations, etc.:-
Winter oats: Balancing Mg applied, plots dug by hand: 4 Sept, 1972. P and K applied, seed drilled: 17 Oct. First N applied: 6 Mar, 1973. First weedkiller applied: 6 Apr. Second N applied: 26 Apr. Second weedkiller applied: 9 May. Harvested: 31 July.
Sugar beet: FYM applied, plots dug by hand: 23 Nov, 1972. P and K applied: 23 Feb, 1973. First N applied, rotary cultivated, Mg applied to half plots, seed drilled: 22 Mar. Boron applied: 26 Mar. Second N applied, singled: 17 May. Insecticide applied: 15 June, 4 July, 18 July. Lifted: 11 Oct.
Barley: Balancing Mg applied: 17 Oct, 1972. Plots dug by hand: 23 Nov. P and K applied, seed drilled: 23 Feb, 1973. Seed redrilled because of damage by mice and birds, first N applied: 16 Mar. Second N applied: 26 Apr. Weedkiller applied: 9 May. Harvested: 31 July.
Grass-clover ley: Seeds drilled in barley stubble: 16 Aug, 1972. P and K applied: 11 Dec. N applied: 6 Mar, 1973. Cut three times: 21 May, 20 July, 24 Sept.
Potatoes: FYM applied, plots dug by hand: 23 Nov, 1972. P and K applied: 23 Feb, 1973. First N applied, Mg applied to half plots, rotary cultivated, potatoes planted, earthed up: 6 Apr. Second N applied: 31 May. Insecticide applied: 15 June. Insecticide with fungicide applied: 4 July, 18 July. Lifted plots without K: 1 Aug. Remaining plots lifted: 5 Sept.
Old grass: P, K and Epsom salts applied: 11 Dec, 1972. FYM applied: 23 Feb, 1973. N applied: 6 Mar, 31 May, 20 July. Cut three times: 31 May, 20 July, 24 Sept.

NOTES: (1) Samples were taken for determination of dry matter for each crop, and the percentage of N, P and K.
(2) The percentage of Mg in sugar beet tops, potato tubers and leaves was determined.
(3) The percentage of K in potato leaves was determined.

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TABLES OF MEANS

TONNES/HECTARE

	OATS		SUGAR BEET		BARLEY	
	GRAIN	STRAW	ROOTS	TOPS	GRAIN	STRAW
MANURE						
0	3.41	3.20	19.3	10.6	2.07	1.62
N1	4.95	4.75	27.0	16.7	3.18	3.76
P	2.45	2.49	17.4	10.8	2.00	1.81
N1P	4.71	4.35	25.8	21.9	2.31	3.15
K	2.20	2.42	23.6	10.8	2.21	1.86
N1K	4.44	5.68	43.4	21.4	4.59	3.94
PK	3.80	3.93	19.1	10.6	2.48	2.08
N1PK	5.40	7.88	42.5	17.8	5.42	5.18
N2PK	4.87	8.27	47.8	34.9	5.54	6.75
D	3.78	3.86	40.5	25.3	3.78	3.12
N1PKD	5.88	7.67	48.7	31.6	5.34	6.34
N2PKD	4.28	9.79	57.8	43.6	4.28	7.94
Mean D.M. %	84.6	62.1			85.4	70.4

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TONNES/HECTARE

	LEY: DRY MATTER					OLD GRASS: DRY MATTER			
	1st cut	2nd cut	3rd cut	Total of 3 cuts	POTATOES TOTAL TUBERS	1st cut	2nd cut	3rd cut	Total of 3 cuts
MANURE									
0	1.15	1.38	1.11	3.64	11.3	1.62	0.57	0.36	2.55
N1	2.99	0.82	0.60	4.41	13.7	3.60	1.41	1.35	6.36
P	1.35	1.05	0.90	3.30	12.8	1.48	0.48	0.27	2.23
N1P	3.73	0.84	0.43	5.00	14.2	3.50	1.50	1.38	6.38
K	3.14	4.15	2.86	10.15	12.6	2.39	1.03	0.64	4.06
N1K	4.72	3.03	2.60	10.35	22.4	4.97	1.92	1.61	8.50
PK	3.93	4.71	2.47	11.11	17.1	2.89	1.27	0.51	4.67
N1PK	5.73	4.20	2.85	12.78	23.6	5.11	2.07	1.35	8.53
N2PK	6.77	2.88	2.26	11.91	40.2	6.11	2.24	1.28	9.63
D	3.77	3.82	2.74	10.33	27.5	3.09	0.91	0.50	4.50
N1PKD	6.08	4.42	3.16	13.66	44.2	5.61	1.94	1.55	9.10
N2PKD	7.08	3.41	2.60	13.09	55.2	6.59	2.63	1.30	10.52
Mean D.M. %	21.4	17.8	21.6	20.3		22.8	24.6	29.7	25.7

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73/R/RN/7

RESIDUAL PHOSPHATE

Object: To study the direct and residual effects of phosphate fertiliser on yields of three crops grown in rotation - Great Field IV and Sawyers I.

Sponsor: G.E.G. Mattingly.

The fourteenth year, potatoes, barley, swedes.

For previous years see 'Details' 1967 and 68/B/5(t), 69/R/RN/7, 70/R/RN/7(t) and 71-72/R/RN/7.

Design: Great Field IV: 1 randomised block of 12 plots for each crop.
Sawyers I: 2 randomised blocks of 12 plots for each crop.

Whole plot dimensions:-
Great Field IV: 4.27 x 18.3. Area harvested: potatoes and barley - 0.00520, swedes - 0.00390.
Sawyers I: 4.27 x 20.1. Area harvested: potatoes and barley - 0.00572, swedes - 0.00429.

Treatments: Rates and frequency of applying phosphate:

	P2O5
None	0
Annual dressings, kg P2O5:-	
29	29 ANN
57	57 ANN
115	115 ANN
172	172 ANN
Triennial dressings, kg P2O5 (last applied 1972):-	
86	86 TRI
172	172 TRI
Six-yearly dressings, kg P2O5 (last applied 1973):-	
344	344 SIX
688	688 SIX
1032	1032 SIX
Single dressing, kg P2O5 applied in 1959:-	
376 as Gafsa rock phosphate	376 G(1)
376 as superphosphate	376 S(1)

NOTES: (1) Since 1960 all phosphate has been applied as superphosphate.
(2) The six-yearly dressings were applied half in autumn before ploughing, half in spring.
(3) For a fuller record of treatments see 'Details' etc.

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Standard applications:-
Potatoes: Manures: N at 250 kg as 'Nitro-Chalk'. K20 at 250 kg as sulphate of potash. Weedkiller: Linuron at 1.1 kg and paraquat at 0.31 kg ion in 450 l. Fungicide: Mancozeb at 1.3 kg in 370 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the mancozeb on the first occasion.
Barley: Manures: (25:0:16) at 400 kg. Weedkiller: Dicamba, mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l).
Swedes: Manures: N at 63 kg as 'Nitro-Chalk'. K20 at 125 kg as sulphate of potash.

Seed: Potatoes: Majestic, Foundation Stock, chitted.
Barley: Julia, dressed with ethirimol, sown at 160 kg.
Swedes: Wilhelmsburger, dressed gamma BHC with captan sown at 1.4 kg.

Cultivations, etc.:- (both fields):- Ploughed: 27 Nov, 1972.
Potatoes: Six-yearly P applied: 14 Nov, 1972 and 29 Jan, 1973. N,K and remaining P applied, potatoes planted: 9 Apr. Weedkiller applied: 12 May. Grubbed: 12 June. Rotary ridged: 15 June. Fungicide and insecticide applied: 2 July. Fungicide applied: 18 July and 9 Aug. Haulm destroyed mechanically: 14 Sept. Sprayed with undiluted BOV at 220 l: 20 Sept. Lifted: 8 Oct.
Barley: Six-yearly P applied: 14 Nov, 1972 and 29 Jan, 1973. Remaining P applied: 22 Feb. Seed sown: 12 Mar. Weedkiller applied: 15 May. Combine harvested: 11 Aug.
Swedes: Six-yearly P applied: 14 Nov, 1972, 29 Jan, 1973. K applied: 27 Apr. Remaining P applied: 14 May. N applied: 16 May. Seed sown: 17 May. Singled: 25 June. Lifted: 8 Nov.

Standard errors per plot. Sawyers I:

Potatoes: total tubers, tonnes/hectare:	1.74 or 5.2%	(11 d.f.)
Barley: grain, tonnes/hectare:	0.233 or 3.9%	(11 d.f.)
Swedes: roots, tonnes/hectare:	2.66 or 11.4%	(11 d.f.)

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73/R/RN/7

TABLES OF MEANS

POTATOES

	TOTAL TUBERS: TONNES/HECTARE		% WARE: 3.81 CM (1.5 INCH) RIDDLE	
	Great Field IV	Sawyers I	Great Field IV	Sawyers I
P205				
0	19.6	28.7	95.4	97.3
29 ANN	28.3	31.2	94.1	97.0
57 ANN	17.0	31.8	85.2	96.3
115 ANN	28.8	35.9	90.8	96.3
172 ANN	21.3	37.2	82.7	96.5
86 TRI	25.6	28.4	94.1	97.0
172 TRI	24.4	34.4	92.0	97.3
344 SIX	36.9	39.8	93.3	96.6
688 SIX	19.1	36.8	78.9	94.5
1032 SIX	40.4	38.3	93.3	93.9
376 G(1)	25.1	27.6	93.1	97.3
376 S(1)	17.0	28.5	92.9	96.9
Mean	25.3	33.2	90.5	96.4

Sawyers I only - TOTAL TUBERS

STANDARD ERROR OF DIFFERENCES

P205

1.74

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BARLEY

	GRAIN: TONNES/HECTARE		STRAW: TONNES/HECTARE	
	Great Field IV	Sawyers I	Great Field IV	Sawyers I
P205				
0	3.37	5.02	4.16	3.66
29 ANN	4.73	5.98	4.47	4.30
57 ANN	4.73	6.10	4.22	4.19
115 ANN	4.75	5.80	4.24	4.31
172 ANN	4.14	6.08	4.95	4.49
86 TRI	3.88	6.10	4.01	3.90
172 TRI	4.69	6.30	4.17	4.44
344 SIX	4.96	5.73	4.58	3.94
688 SIX	4.62	6.15	4.61	4.55
1032 SIX	4.30	6.13	4.58	4.63
376 G(1)	3.44	5.59	4.43	3.92
376 S(1)	4.02	5.94	4.85	4.10
Mean	4.30	5.91	4.44	4.20

Sawyers I only - GRAIN

STANDARD ERROR OF DIFFERENCES

P205

0.233

Mean D.M. %	75.1	76.5	94.1	92.9

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SWEDES, ROOTS: TONNES/HECTARE

	Great Field IV	Sawyers I
P205		
0	1.9	11.5
29 ANN	15.7	20.8
57 ANN	19.6	27.5
115 ANN	14.5	30.3
172 ANN	23.4	28.6
86 TRI	15.2	21.1
172 TRI	12.3	26.5
344 SIX	24.6	28.3
688 SIX	21.5	30.7
1032 SIX	20.8	31.7
376 G(1)	8.5	12.0
376 S(1)	3.3	11.2
Mean	15.1	23.4

Sawyers I only

STANDARD ERROR OF DIFFERENCES

P205

2.66

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73/R/RN/8

CULTIVATION/WEEDKILLER

Object: To determine the long term effects of weedkillers and different methods of primary cultivation on a rotation of crops - Great Harpenden I.

Sponsors: J.R. Moffatt, G.V. Dyke, J.A. Currie.

The 13th year, winter wheat.

For previous years see 'Details' 1967, 68/B/6(t), 69/R/RN/8(t), 70/R/RN/8, 71/R/RN/8(t), and 72/R/RN/8.

Design: 2 randomised blocks of 12 plots, split into 2.

Whole plot dimensions: 12.8 x 15.2. Sub plot area harvested: 0.00434.

Treatments: All combinations of:-

Whole plots:	(1) Primary cultivations annually:-	CULTIVTN
	Ploughed: 18 Oct, 1972, power harrowed and disced: 24 Oct	Plough
	Rotary cultivated: 9 Nov	Rotavate
	Deep-tine cultivated twice: 18 Oct, spring-tine cultivated: 23 Oct	Deeptine
	(2) Weed control to beans 1972:-	WEEDKLLR(72)
	Mechanical	Mechancl
	Simazine at 1.12 kg	Simazine
	Dinoseb acetate at 6.73 kg	Dinoseb
Sub plots:	(3) Paraquat to bean stubble:-	PARAQUAT
	None	0.00
	0.56 kg ion in 220 l: 5 Oct	0.56
	(4) Weed control to wheat in 1973:-	WEEDKLLR(73)
	None	None
	Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l: 17 Apr, 1973	Ioxy/mec

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together with three extra plots, all of which received simazine at 1.12 kg to beans 1972:- EXTRA

Spike rotary cultivated: 17 Oct, with sub plot treatments (3) and (4) above — Spiked

Shallow ploughed: 18 Oct, power harrowed and disced: 24 Oct, whole plot received paraquat as (3) above, sub plot treatments (4) only — ShalloPl

Standard cultivation, ploughed for wheat: 18 Oct, power harrowed and disced: 24 Oct, with sub plot treatments (3) and (4) — Standard

NOTE: From 1973 only one phase of the rotation, wheat, potatoes, barley, beans, is maintained each year.

Basal applications: Manures: (10:24:24) at 250 kg combine drilled. 'Nitro-Chalk' at 375 kg.

Seed: Bouquet, sown at 200 kg.

Cultivations, etc.:- Seed sown: 9 Nov, 1972. N applied: 12 Apr, 1973. Combine harvested: 24 Aug.

NOTE: Scores were made for weed infestation on all sub plots.

Standard errors per plot (omitting EXTRA plots). Grain, tonnes/hectare:
Whole plot: 0.476 or 8.0% (8 d.f.)
Sub plot: 0.411 or 6.9% (8 d.f.)

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73/R/RN/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	Plough	CULTIVTN Rotavate	Deeptine	Mean	Spiked	EXTRA ShalloPl	Standard
Mean	5.48	6.33	6.10	5.97	5.36	5.06	5.80
WEEDKLLR(72)							
Mechancl	5.91	6.48	6.23	6.21			
Simazine	5.61	6.03	5.70	5.78			
Dinoseb	4.92	6.50	6.38	5.93			
PARAQUAT							
0.00	5.44	6.40	5.95	5.93	5.16		5.56
0.56	5.51	6.27	6.25	6.01	5.45	5.17	5.94
WEEDKLLR(73)							
None	5.29	6.09	5.70	5.70	5.22	4.62	5.64
Ioxy/mec	5.67	6.58	6.50	6.25	5.50	5.49	5.97

STANDARD ERRORS OF DIFFERENCES

CULTIVTN	WEEDKLLR(72)	PARAQUAT	WEEDKLLR(73)	CULTIVTN WEEDKLLR(72)	CULTIVTN PARAQUAT	CULTIVTN WEEDKLLR(73)
0.275	0.275	0.137	0.137	0.476	0.322	0.322
Except when comparing means with same level of: CULTIVTN					0.237	0.237

Grand mean 5.83

Mean D.M. % 86.6

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73/R/RN/9

CEREAL DISEASE REFERENCE PLOTS

Object: To study the effects of intensive cereal cropping on the incidence of soil-borne diseases, especially in relation to seasonal variation - Pennell's Piece.

Sponsors: D.B. Slope, E.W. Broom, G.A. Salt.

The eleventh year, winter wheat, spring oats, beans.

For previous years see 63/C/10(t), 64-65/C/9, 66/C/7, 67-68/C/5 and 69-72/R/RN/9.

Design: 2 randomised blocks of 6 plots.

Whole plot dimensions: 17.1 x 4.27. Area harvested: 0.00479.

Treatments: Previous crops (1963-72):-

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	PREVCROP
W	W	W	BE	O	W	W	W	BE	O	W/W/BE/O
W	W	BE	O	W	W	W	BE	O	W	W/BE/O/W
W	BE	O	W	W	W	BE	O	W	W	BE/O/W/W
BE	O	W	W	W	BE	O	W	W	W	-
O	W	W	W	BE	O	W	W	W	BE	-
W	W	W	W	W	W	W	W	W	W	W/W/W/W

where: W = wheat, BE = beans, O = oats

NOTE: Spring wheat series discontinued from 1973.

Standard applications:

Winter wheat: Manures: (0:14:28) at 270 kg, combine drilled, 'Nitro-Chalk' at 500 kg. Weedkillers: Terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l), MCPA, mecoprop and dicamba ('Tetralex Plus' at 9.1 l in 220 l).

Spring beans: Manures: (0:14:28) at 450 kg, placement drilled. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Spring oats: Manures: (0:14:28) at 270 kg, combine drilled, 'Nitro-Chalk' at 200 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 220 l).

Seed: Winter wheat: Cappelle, sown at 200 kg
Spring beans: Minor, sown at 220 kg
Spring oats: Manod, sown at 190 kg.

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Cultivations, etc.:- All plots: Ploughed: 12 Oct, 1972. Winter wheat: Rotary harrowed, seed sown: 13 Oct. 'Prebane' applied: 20 Oct. N applied: 23 Mar, 1973. 'Tetralex Plus' applied: 26 Apr. Combine harvested: 22 Aug.
Spring beans: Power harrowed: 8 Mar, 1973. Seed sown: 9 Mar. Insecticide applied: 8 June. Combine harvested: 4 Sept.
Spring oats: Power harrowed: 8 Mar, 1973. Seed sown: 14 Mar. N applied: 23 Mar. Weedkiller applied: 15 May. Combine harvested: 23 Aug.

NOTES: (1) Yields were taken for winter wheat only.
(2) Estimates were made in July of incidence of Take-all (Gaeumannomyces graminis) and eyespot (Cercosporella herpotrichoides) in the wheat.

TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

PREVCROP

W/W/BE/O	W/BE/O/W	BE/O/W/W	W/W/W/W	Mean
5.51	5.13	4.01	5.05	4.92

Mean D.M. % 82.5

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73/R/RN/11

IRRIGATION

Object: To study the effects of irrigation on a rotation of crops. Other agronomic factors are included from time to time - Great Field I and II.

Sponsors: B.J. Legg, B.K. French.

The tenth year, fallow (Gt. Field I), potatoes (Gt. Field II).

For previous years see 64/C/15(t), 65/C/14(t), 66/C/9(t), 67/C/7(t), 68/C/6(t), 69/R/RN/11(t), 70/R/RN/11(t), 71/R/RN/11(t) and 72/R/RN/11(t).

Design: 4 randomised blocks of 4 plots, split into half and quarter plots.

Treatments: All combinations of:-

Whole plots: 1. Irrigation		IRRIGN
	None	None
	Full	Full
2. Plant population		POPULATN
	Normal, 71 cm between rows, 38 cm between plants in rows	Normal
	Quarter normal, 142 cm between rows, 76 cm between plants in rows	Quarter
Half plots: 3. Chitting and planting dates		CHITTING
	Chitted seed, planted early	CH/Early
	Unchitted seed, planted late	C/Late
Quarter plots: 4. Nitrogen fertiliser (kg N)		N
	163 in basal (13:13:20)	163
	163 in basal (13:13:20) + 163 as 'Nitro-Chalk'	326

Whole plot dimensions: 30.5 x 30.5. Sub plot area harvested: 0.00303.

Standard applications:-
Potatoes: Manures: (13:13:20) at 1300 kg, supplying the first rate of N. Weedkillers: Linuron at 1.1 kg and paraquat at 0.31 kg ion in 450 l. Fungicide: Mancozeb at 1.3 kg in 370 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the mancozeb on the first occasion.

Seed: King Edward, Rothamsted, once grown.

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Cultivations, etc.:

Fallow: Ploughed: 1 Feb, 1973. Rotary cultivated 3 times: 26 Apr, 25 May, 2 July. Deep-tine cultivated: 28 July.

Potatoes: Ploughed: 8 Nov, 1972. Basal NPK and test N applied for first planting: 29 Mar, 1973. Plots rotary cultivated, seed planted (first planting): 30 Mar. Basal NPK and test N applied, rotary cultivated, seed planted (second planting): 2 May. Weedkiller applied to first planting: 5 May. Weedkiller applied to second planting: 18 May. Early planting grubbed and rotary ridged: 11 June. Late planting rotary ridged: 3 July. Sprayed with fungicide and insecticide: 3 July. Sprayed with fungicide: 24 July and 10 Aug. Haulm destroyed mechanically, sprayed with undiluted BOV at 220 l: 31 Aug. Lifted: 9 Oct.

Standard errors per plot. Total tubers: tonnes/hectare.

Whole plot:	3.02 or 10.4%	(9 d.f.)
Sub plot:	2.23 or 7.7%	(12 d.f.)
Quarter plot:	2.56 or 8.8%	(24 d.f.)

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73/R/RN/11

RAINFALL AND IRRIGATION: MM

Week ending	RAINFALL	IRRIGATION TO potatoes (Early and Late)
May 5	21.5	
May 12	13.5	
May 19	9.0	
May 26	12.0	
June 2	7.1	
June 9	TR	
June 14	-	25.0
June 16	0.0	
June 18	-	25.0
June 23	37.8	
June 30	43.9	
July 7	33.5	
July 14	0.5	
July 21	20.6	
July 28	TR	
July 30	-	25.0
Aug 4	6.3	
Aug 11	24.1	
Aug 18	0.0	
Aug 25	TR	
Sept 1	11.4	
Sept 8	TR	
Sept 15	3.1	
Sept 22	40.8	
Sept 29	19.2	
Total	304.3	75.0

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TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	POPULATN		CHITTING		N		
	Normal	Quarter	CH/Early	O/Late	163	326	Mean
IRRIGN							
None	41.1	22.5	35.1	28.5	31.3	32.3	31.8
Full	36.2	16.4	30.2	22.4	25.1	27.5	26.3
		POPULATN					
		Normal	43.2	34.1	38.1	39.2	38.6
		Quarter	22.1	16.8	18.3	20.6	19.5
				CHITTING			
				CH/Early	32.1	33.2	32.7
				O/Late	24.3	26.6	25.4
Mean					28.2	29.9	29.1

	CHITTING	CH/Early		O/Late	
	N	163	326	163	326
IRRIGN	POPULATN				
None	Normal	45.5	45.5	36.5	36.9
None	Quarter	24.3	25.1	18.9	21.6
Full	Normal	41.1	40.8	29.2	33.8
Full	Quarter	17.5	21.5	12.7	14.1

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73/R/RV/11

TOTAL TUBERS: TONNES/HECTARE

STANDARD ERRORS OF DIFFERENCES

IRRIGN	POPULATN	CHITTING	N	IRRIGN POPULATN	IRRIGN CHITTING	POPULATN CHITTING	IRRIGN N
1.51	1.51	0.79	0.64	2.14	1.70	1.70	1.64

POPULATN N	CHITTING N	IRRIGN POPULATN CHITTING N
1.64	1.02	2.73

Except when comparing means with same levels of

IRRIGN.POPULATN	2.03
IRRIGN.POPULATN. CHITTING	1.81
IRRIGN.POPULATN.N	2.03

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PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	POPULATN		CHITTING		N		
	Normal	Quarter	CH/Early	O/Late	163	326	Mean
IRRIGN							
None	70.5	83.1	79.4	74.1	74.8	78.7	76.8
Full	63.2	76.6	74.7	65.1	67.8	71.9	69.9
POPULATN							
Normal			71.3	62.4	63.7	70.0	66.9
Quarter			82.8	76.8	78.9	80.7	79.8
CHITTING							
CH/Early					75.2	78.9	77.1
O/Late					67.4	71.8	69.6
Mean					71.3	75.3	73.3

CHITTING		CH/Early		O/Late	
N		163	326	163	326
IRRIGN	POPULATN				
None	Normal	70.7	76.6	64.8	70.1
None	Quarter	85.6	84.9	78.3	83.4
Full	Normal	64.9	73.1	54.6	60.1
Full	Quarter	79.8	80.9	72.0	73.5

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73/W/RN/12

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the cumulative effects of a range of types of organic matter - Woburn Stackyard B.

Sponsor: G.E.G. Mattingly.

The ninth year, winter wheat and potatoes.

For previous years see 66/C/31(t), 67/C/24(t), 68/C/18(t), 69/W/RN/12(t), 70/W/RN/12(t), 71/W/RN/12(t) and 72/W/RN/12(t).

Design: For each crop: 2 blocks of 8 plots split into 8.

Whole plot dimensions: 8.53 x 30.5. Area harvested: Potatoes - 0.00087 -,Winter wheat - 0.00173.

Treatments: Between 1966 and 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. A rotation of potatoes, wheat, sugar beet and barley was started on two blocks in 1972 and the remaining two blocks in 1973. Organic manures were last applied in 1971, leys were ploughed in autumn 1971 and 1972 before starting the rotation. The experiment now tests all combinations of:-

Whole plots: 1. Organic manures and fertilisers in the preliminary period:

	MANURE
Farmyard Manure	FYM
Straw	Straw
Peat	Peat
Green manures	Greenmnr
Fertilisers equivalent to FYM	Fert-FYM
Fertilisers equivalent to straw	Fert-Str
Grass/clover ley no N	Clovrley
Grass ley with N for each cut	Grassley

Sub plots: 2. Fertiliser nitrogen (kg N) in 1973: N

Wheat	Potatoes	Wheat	Potatoes
None	None	0	0
25	50	25	50
50	100	50	100
75	150	75	150
100	200	100	200
125	250	125	250
150	300	150	300
175	350	175	350

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Fertilisers applied for potatoes 1973 to balance differential crop removals in 1972 (kg):

	P205	K20
Farmyard manure	38	88
Straw	None	None
Peat	None	None
Green manures	25	50
Fertilisers equivalent to FYM	None	None
Fertilisers equivalent to Straw	None	None
Grass/clover ley no N	None	75
Grass ley with N for each cut	None	126

Basal applications:
Potatoes: Manures: Superphosphate at 230 kg P205, muriate of potash at 240 kg K20 in the autumn and at the same rates in spring. Epsom salts at 100 kg MgO. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.
Winter wheat: Weedkillers: Paraquat at 0.56 kg ion in 280 l. Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.

Seed: Winter wheat: Cappelle sown at 200 kg. Potatoes: Pentland Crown.

Cultivations, etc.:-
Winter wheat: Deep-tine cultivated: 30 Sept, 1972. Seed sown (mixed varieties in error): 20 Oct. Paraquat applied: 17 Nov. Seed re-sown: 24 Nov. N applied: 13 Apr. Ioxynil and mecoprop applied: 26 Apr. Combine harvested: 23 Aug.
Potatoes: Basal K applied: 16 Nov, 1972. Basal P applied: 17 Nov. Ploughed: 30 Nov. Balancing P and K applied: 26 Mar, 1973. Basal P applied: 27 Mar. Basal K applied: 29 Mar. N applied: 5 Apr. Basal Mg applied, rotary cultivated, potatoes planted: 6 Apr. Weedkiller applied: 9 May. Grubbed: 1 June. Rotary ridged: 4 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 10 Oct.

NOTE: (1) Leaf samples of both wheat and potatoes were taken for boron analysis.
(2) Soil samples were taken in the spring and mid-season for P, K and Mg analysis.
(3) Winter wheat. One plot treatment MANURE-Fert-Str, NO was badly damaged by rabbits. Values for grain and straw estimated from visual scores made just before harvest were used in the analysis.

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Standard errors per plot.

Winter wheat, grain, tonnes/hectare:	Whole plot:	0.491 or 10.5% (7 d.f.)
	Sub plot:	0.455 or 9.8% (56 d.f.)
Potatoes, total tubers, tonnes/hectare:	Whole plot:	5.39 or 10.8% (7 d.f.)
	Sub plot:	4.44 or 8.9% (56 d.f.)

Corrections to 'Yields' 1972 (p. 108):-

1. Basal applications to potatoes of P_2O_5 and K_2O should read '230 kg P_2O_5' and '240 kg K_2O' in both autumn and spring.
2. Standard errors per plot for potatoes should read:
   Whole plot: 3.07 or 9.0% (7 d.f.)
   Sub plot: 3.05 or 9.0% (56 d.f.)

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73/W/RN/12

TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	3.11	3.34	4.61	4.91	5.71	5.69	5.57	5.52	4.81
Straw	2.06	3.14	4.67	5.60	5.91	5.82	5.56	5.42	4.77
Peat	1.28	3.34	3.65	4.88	5.18	4.88	5.35	5.00	4.19
Greenmnr	2.50	3.62	5.16	5.23	5.85	5.50	5.38	5.62	4.86
Fert-FYM	1.78	2.83	3.94	4.83	4.71	5.24	5.17	5.20	4.21
Fert-Str	1.19	2.88	4.05	4.54	4.92	4.71	4.83	4.42	3.94
Clovrley	3.92	5.40	5.60	6.23	5.74	5.62	5.71	5.05	5.41
Grassley	3.47	4.75	5.96	5.85	5.64	5.52	5.11	4.49	5.10
Mean	2.41	3.66	4.70	5.26	5.46	5.37	5.34	5.09	4.66

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE N
0.491	0.161	0.649
Except when comparing means with same level of MANURE		0.455

Mean D.M. % 85.1

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WINTER WHEAT

STRAW: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	2.69	3.31	4.36	5.33	4.92	6.16	6.48	6.11	4.92
Straw	1.62	3.15	4.41	4.95	5.16	5.23	6.38	6.36	4.66
Peat	1.28	3.12	3.68	4.01	5.24	5.57	5.49	5.24	4.20
Greenmnr	2.23	3.33	4.51	4.51	6.34	5.25	6.21	5.97	4.79
Fert-FYM	1.73	2.85	4.01	4.77	4.80	5.36	5.29	5.82	4.33
Fert-Str	0.86	2.94	3.78	4.03	4.88	4.77	4.69	4.86	3.85
Clovrley	2.99	4.71	5.18	5.73	6.12	5.92	6.03	6.74	5.43
Grassley	3.00	4.06	5.47	5.19	5.77	6.44	6.18	6.26	5.30
Mean	2.05	3.44	4.42	4.81	5.40	5.59	5.84	5.92	4.68

Mean D.M. % 80.3

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POTATOES

TOTAL TUBERS: TONNES/HECTARE

	N							
	0	50	100	150	200	250	300	350	Mean
MANURE									
FYM	32.3	41.8	49.4	54.6	56.2	54.1	59.9	61.7	51.2
Straw	31.1	39.5	49.7	51.6	57.0	60.8	61.9	58.7	51.3
Peat	22.9	31.7	39.4	41.6	49.2	49.1	52.4	55.3	42.7
Greenmnr	32.9	40.8	41.3	43.1	54.3	50.7	50.3	54.6	46.0
Fert-FYM	22.9	34.2	40.3	44.7	49.8	50.5	51.2	52.7	43.3
Fert-Str	26.2	34.1	44.3	47.7	48.5	46.0	53.2	62.3	45.3
Clovrley	49.0	57.9	57.0	62.9	59.2	63.4	64.1	66.5	60.0
Grassley	50.5	56.1	59.6	59.9	63.1	56.7	64.6	61.9	59.0
Mean	33.5	42.0	47.6	50.8	54.7	53.9	57.2	59.2	49.9

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE N
5.39	1.57	6.81
Except when comparing means with same level of MANURE		4.44

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POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

N

MANURE	0	50	100	150	200	250	300	350	Mean
FYM	96.2	98.2	98.1	98.9	98.2	98.3	98.3	98.4	98.1
Straw	97.5	97.3	98.8	97.1	98.0	97.5	98.1	97.9	97.8
Peat	92.3	96.7	97.3	97.7	97.2	98.4	98.1	97.2	96.9
Greenmnr	96.7	97.9	97.5	97.2	98.3	98.5	97.6	97.7	97.7
Fert-FYM	94.0	95.8	97.7	97.4	97.4	97.3	98.1	97.3	96.9
Fert-Str	93.2	96.3	95.4	98.3	97.4	97.8	97.7	97.8	96.7
Clovrley	97.5	98.3	98.0	98.4	98.3	98.4	98.2	97.5	98.1
Grassley	98.2	98.1	98.0	98.1	97.9	97.8	98.6	98.3	98.1
Mean	95.7	97.3	97.6	97.9	97.8	98.0	98.1	97.8	97.5

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73/W/RN/13

INTENSIVE CEREALS

Object: To study the effects of intensive cereal cropping on yield, incidence of soil-borne diseases and organic matter in the soil - Woburn Stackyard I.

Sponsors: G.W. Cooke, D.B. Slope.

The eighth year, ley, potatoes, winter wheat, barley.

For previous years see 66/B/9(t), 67/B/9, 68/B/7(t), 69/W/RN/13(t), 70/W/RN/13(t), 71/W/RN/13(t) and 72/W/RN/13.

Design: For each experiment: 2 randomised blocks of 6 plots, split into 4.

Whole plot dimensions: 8.53 x 20.4. Sub plot area harvested: Potatoes - 0.00139. Wheat - 0.00277. Barley - 0.00273. Ley - 0.00089.

Treatments:-

One experiment on winter wheat on part of the site of the classical wheat experiment 1877-1954 WHEATSTE

One experiment on barley on part of the site of the classical barley experiment 1877-1954 BARLYSTE

Factors tested on both experiments are the same but crop and nitrogen rates differ. All combinations of:-

Whole plots: 1. Previous crops: PREVCROP

1966	1967	1968	1969	1970	0971	1972	
L	P	C	C	C	L	P	C/C/L/P
P	C	C	C	L	P	C	C/L/P/C
C	C	C	L	P	C	C	L/P/C/C
C	C	L	P	C	C	C	P/C/C/C
C	L	P	C	C	C	L	C/C/C/L
C	C	C	C	C	C	C	C/C/C/C

Ley = 1 year ley P = Potatoes C = Cereal: wheat or barley.

Sub plots: 2. Nitrogen fertiliser (kg N): N

To wheat	To barley	Wheat	Barley
63	50	63	50
126	100	126	100
189	150	189	150
252	200	252	200

Ley and potatoes received basal N only, residues of dressings to cereals are tested (NRESID).

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Basal applications: All crops: Manures: (0:14:28) at 130 kg P2O5, 260 kg K2O, half ploughed in, half applied to the plough furrow. Weedkiller to all crops except potatoes: Paraquat at 0.56 kg ion in 280 l.
Ley: 'Nitro-Chalk' at 60 kg N in seedbed, 60 kg N after sowing, and 60 kg N after the first cut. Two cuts were taken.
Potatoes: 'Nitro-Chalk' at 150 kg N. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.
Wheat: Weedkiller: Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.
Barley: Weedkiller: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 280 l.

Seed: Ley: Italian ryegrass S22, sown at 40 kg.
Potatoes: Majestic.
Wheat: Cappelle, sown at 200 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- All plots: Half PK applied: 4 Oct, 1972.
Ploughed: 10 Oct. Remaining PK applied: 17 Oct.
Ley: Paraquat applied: 6 Sept, 1972. Power harrowed, wheat site only: 18 Oct. N applied: 16 Mar, 1973. Seeds sown: 20 Mar. N applied: 18 May, 3 July. Cut twice: 2 July, 28 Aug.
Potatoes: Power harrowed, wheat site only: 18 Oct, 1972. N applied: 23 Mar, 1973. Rotary cultivated: 6 Apr. Potatoes planted: 7 Apr. Linuron with paraquat applied: 14 May. Grubbed: 1 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 4 Oct.
Wheat: Paraquat applied: 6 Sept, 1972. Power harrowed: 18 Oct. Seed sown: 20 Oct. N applied: 12 Apr, 1973. Ioxynil with mecoprop applied: 26 Apr. Combine harvested: 22 Aug.
Barley: Paraquat applied: 6 Sept, 1972. Seed sown: 12 Mar, 1973. N applied: 16 Mar. Ioxynil with mecoprop applied: 11 May. Combine harvested: 13 Aug.

NOTE: Estimates of eyespot (Cercosporella herpotrichoides) and take-all (Gaeumannomyces graminis) were made on both cereal crops in July.

Standard errors per sub plot.
Wheat, grain, tonnes/hectare: 0.141 or 3.8% (12 d.f.)
Barley, grain, tonnes/hectare: 0.256 or 5.6% (12 d.f.)

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TABLE OF MEANS

LEY

DRY MATTER: TONNES/HECTARE

PERMANENT WHEAT BLOCKS

NRESID

63	126	189	252	Mean
		1ST CUT		
3.79	3.77	3.74	4.35	3.91
		2ND CUT		
3.68	4.07	3.98	4.19	3.98
		TOTAL OF 2 CUTS		
7.47	7.84	7.72	8.54	7.89

Mean D.M. % 1st Cut: 17.6
2nd Cut: 21.1
Total of 2 cuts: 19.4

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LEY

DRY MATTER: TONNES/HECTARE

PERMANENT BARLEY PLOTS

NRESID

50	100	150	200	Mean
		1ST CUT		
5.30	5.10	5.25	4.81	5.11
		2ND CUT		
4.60	4.47	4.47	4.41	4.49
		TOTAL OF 2 CUTS		
9.90	9.57	9.71	9.22	9.60

Mean D.M. % 1st Cut: 16.5
2nd Cut: 20.4
Total of 2 cuts: 18.5

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POTATOES

PERMANENT WHEAT BLOCKS

NRESID

63	126	189	252	Mean
	TOTAL TUBERS: TONNES/HECTARE			
49.3	46.5	49.7	46.4	48.0
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE			
90.9	91.7	93.2	92.2	92.0

PERMANENT BARLEY BLOCKS

NRESID

50	100	150	200	Mean
	TOTAL TUBERS: TONNES/HECTARE			
47.1	47.8	51.4	47.6	48.5
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE			
92.2	92.1	91.7	91.5	91.9

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73/W/RN/13

WINTER WHEAT

N

	63	126	189	252	Mean
PREVCROP		GRAIN: TONNES/HECTARE			
C/C/L/P	4.48	5.13	4.54	4.11	4.57
C/L/P/C	3.12	4.36	4.01	4.05	3.88
L/P/C/C	2.32	3.67	3.38	3.21	3.15
C/C/C/C	2.90	3.37	3.41	3.15	3.21
Mean	3.21	4.13	3.84	3.63	3.70

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.071	0.141

* Within the same level of PREVCROP only

PREVCROP		STRAW: TONNES/HECTARE			
C/C/L/P	4.50	5.04	5.05	4.83	4.85
C/L/P/C	3.47	4.85	3.21	4.62	4.04
L/P/C/C	2.72	4.09	4.45	4.53	3.95
C/C/C/C	3.57	3.59	3.86	3.93	3.74
Mean	3.56	4.39	4.14	4.48	4.14

Mean D.M. % Grain 84.4
Straw 91.2

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BARLEY

N

	50	100	150	200	Mean
PREVCROP		GRAIN: TONNES/HECTARE			
C/C/L/P	4.83	4.98	4.98	4.57	4.84
C/L/P/C	3.86	5.03	4.60	4.73	4.56
L/P/C/C	3.89	4.91	4.52	4.56	4.47
C/C/C/C	3.62	4.77	4.69	4.66	4.44
Mean	4.05	4.92	4.70	4.63	4.58

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.128	0.253

* Within the same level of PREVCROP only

PREVCROP			STRAW: TONNES/HECTARE		
C/C/L/P	3.23	4.02	4.09	4.32	3.92
C/L/P/C	2.12	3.97	3.74	4.49	3.58
L/P/C/C	2.10	4.13	3.58	4.03	3.46
C/C/C/C	2.07	3.35	3.58	3.86	3.21
Mean	2.38	3.87	3.75	4.18	3.54

Mean D.M. % Grain 84.4
Straw 90.3

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73/W/RN/14

LONG TERM PHOSPHATE

Object: To study direct and residual effects of superphosphate on a clover/grass ley - Woburn Stackyard III.

Sponsor: G.E.G. Mattingly.

The sixth year, clover/grass ley.

For previous years see 68/B/8(t), 69/W/RN/14, 70/W/RN/14(t), 71/W/RN/14(t) and 72/W/RN/14(t).

Design: 6 blocks of 6 plots, split into 2.

Whole plot dimensions: 8.53 x 15.8.

Treatments:- P_2O_5, applied as superphosphate, cumulatively to dressings in 1967: 0, 170, 340, 690, 1030 kg.

Basal applications: 30 kg N as 'Nitro-Chalk'. Weedkiller: Benazolin, 2,4-DB and MCPA ('Legumex Extra' at 7.0 l in 280 l).

Seed: Ley mixture sown at 56 kg except plots 01-06 at 25 kg. Seed composition: 38% S215 Meadow Fescue, 25% Comtessa Meadow Fescue, 25% S48 Timothy, 9% Huia White Clover, 3% Wild White Clover.

Cultivations, etc.:- Deep-tine cultivated: 30 Sept, 1972. Ploughed: 20 Dec. N applied: 23 Mar, 1973. P treatments applied, rotary harrowed: 27 Mar. Seeds sown: 28 Mar. Weedkiller applied: 31 May. Topped: 12 June. Cut: 2 Aug.

NOTE: No yields were taken.

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73/W/RN/15

ROTATION AND FUMIGATION

Object: To study different ways of using nematicides in a three-course rotation and to determine the effects on crop yield and incidence of pathogenic nematodes - Woburn Butt Close.

Sponsors: F.G.W. Jones, D.C.M. Corbett, A.G. Whitehead, T.D. Williams.

The fifth year, potatoes, barley, sugar beet.

For previous years see 69/W/RN/15(t), 70/W/RN/15(t) and 71-72/W/RN/15.

Design: 3 series each of 2 blocks of 3 plots split into 7.

Whole plot dimensions: 5.33 x 31.1. Sub plot area harvested: Barley: 0.00052 - potatoes: 0.00104 - sugar beet: 0.00156.

Treatments:

All phases of the rotation potatoes, barley, sugar beet are present. Each crop tests all combinations of:-

Whole plots: 1. Nitrogen fertiliser (kg N): N

To potatoes and sugar beet	To barley	To potatoes and sugar beet	Barley
75	38	75	38
150	75	150	75
225	113	225	113

Sub plots: 2. Fumigants: FUMIGANT

None (two sub plots per plot)	0
Dichloropropane/dichloropropene ('D-D') at 448 kg before potatoes	DD(P)
Dichloropropane/dichloropropene ('D-D') at 448 kg before sugar beet	DD(SB)
Dichloropropane/dichloropropene ('D-D') at 448 kg before barley	DD(B)
Dichloropropane/dichloropropene ('D-D') at 448 kg before all crops	DD(ALL)
Dazomet at 224 kg before all crops	DAZ(ALL)

Basal applications:

Barley: Manures: (0:20:20) at 300 kg combine drilled.

Potatoes: Manures: (0:14:28) at 1050 kg. Weedkiller: Linuron at 1.2 kg in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

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Sugar beet: Manures: Magnesian limestone at 2.5 tonnes. (0:14:28) at 1050 kg. Boron at 7.4 kg B2O3 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Weedkiller: Phenmedipham at 1.6 kg in 280 l.

Seed: Barley: Julia, dressed with ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.
Sugar beet: Klein E, sown at 8.0 kg.

Cultivations, etc.:-
All plots: Ploughed: 29 Nov, 1972. Dazomet applied and these plots only rotary cultivated, 'D-D' injected: 12 Jan, 1973. Ploughed: 7 Feb.
Barley: N applied, seed sown: 13 Mar, 1973. Combine harvested: 20 Aug.
Potatoes: PK applied: 20 Mar, 1973. N applied: 23 Mar. Rotary cultivated: 3 Apr. Potatoes planted: 5 Apr. Weedkiller applied: 14 May. Grubbed: 1 June. Rotary ridged: 5 June. Fungicide and insecticide applied: 5 July. Fungicide applied: 25 July, 13 Aug. Haulm mechanically destroyed: 18 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 2 Oct.
Sugar beet: Magnesian limestone applied: 7 Oct, 1972. PK applied: 20 Mar, 1973. N applied, seed sown: 21 Mar. Weedkiller applied: 15 May. Singled: 25-29 May. Boron and insecticide applied: 25 June. Lifted: 9 Nov.

NOTE: Soil samples were taken after harvest for eelworm counts.

Standard errors per sub plot.

Barley, grain, tonnes/hectare:	0.332 or 7.2% (21 d.f.)
Potatoes, total tubers, tonnes/hectare:	3.76 or 8.9% (21 d.f.)
Sugar beet, roots, tonnes/hectare:	2.12 or 7.1% (21 d.f.)
total sugar, tonnes/hectare:	0.376 or 7.4% (21 d.f.)

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TABLES OF MEANS

BARLEY

N	FUMIGANT 0	DD(P)	DD(SB)	DD(B)	DD(ALL)	DAZ(ALL)	Mean
	GRAIN: TONNES/HECTARE						
38	3.69	4.65	4.39	3.66	3.34	4.63	4.01
75	4.23	5.29	5.35	4.44	4.38	4.98	4.70
113	5.00	5.09	5.61	4.92	4.99	5.21	5.12
Mean	4.31	5.01	5.12	4.34	4.23	4.94	4.61

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
0 v any of remainder	0.166	0.288
Between any of remainder	0.192	0.332

* Within the same level of N only

Mean D.M. % 83.9

N	STRAW: TONNES/HECTARE						
38	2.38	3.38	3.11	2.45	2.39	3.13	2.75
75	3.12	3.96	3.89	3.35	3.26	3.69	3.48
113	3.84	4.24	4.73	3.72	3.80	4.10	4.04
Mean	3.11	3.86	3.91	3.17	3.15	3.64	3.42

Mean D.M. % 90.3

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POTATOES

N	FUMIGANT 0	DD(P)	DD(SB)	DD(B)	DD(ALL)	DAZ(ALL)	Mean
	TOTAL TUBERS: TONNES/HECTARE						
75	29.5	40.8	36.2	38.9	39.3	41.7	36.6
150	37.5	46.7	47.2	39.7	52.6	52.4	44.8
225	28.3	51.5	52.7	45.9	56.8	54.5	45.4
Mean	31.8	46.3	45.4	41.5	49.6	49.5	42.3

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
0 v any of remainder	1.88	3.25
Between any of remainder	2.17	3.76

* Within the same level of N only

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

N							
75	95.3	96.0	97.0	96.5	96.5	96.1	96.1
150	96.5	96.4	97.8	97.5	96.8	97.0	96.9
225	95.0	97.5	97.9	97.3	96.7	97.5	96.7
Mean	95.6	96.6	97.6	97.1	96.7	96.9	96.6

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73/W/RN/15

SUGAR BEET

N	FUMIGANT 0	DD(P)	DD(SB)	DD(B)	DD(ALL)	DAZ(ALL)	Mean
	ROOTS (WASHED): TONNES/HECTARE						
75	20.5	26.0	24.3	21.2	22.3	26.7	23.1
150	33.6	36.6	34.3	33.1	34.4	31.6	33.9
225	30.6	30.7	34.8	35.9	33.4	31.4	32.5
Mean	28.2	31.1	31.1	30.1	30.0	29.9	29.8

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
0 v any of remainder	2.47	1.84
Between any of remainder	2.69	2.12

* Within the same level of N only

N	SUGAR PERCENTAGE						
75	17.4	17.5	17.2	17.5	17.4	17.6	17.5
150	17.3	17.5	17.2	17.3	16.8	17.3	17.3
225	16.7	17.0	16.3	16.7	16.4	16.5	16.6
Mean	17.2	17.3	16.9	17.2	16.9	17.2	17.1

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73/W/RN/15

SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

	FUMIGANT						
	0	DD(P)	DD(SB)	DD(B)	DD(ALL)	DAZ(ALL)	Mean
N							
75	3.57	4.57	4.19	3.71	3.90	4.72	4.03
150	5.81	6.42	5.92	5.72	5.79	5.47	5.85
225	5.13	5.21	5.68	5.97	5.47	5.18	5.39
Mean	4.84	5.40	5.26	5.14	5.05	5.12	5.09

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
0 v any of remainder	0.188	0.325
Between any of remainder	0.217	0.376

* Within the same level of N only

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73/R/CS/1

LEVELS OF N AND K

Object: To study the residual effects of N, P and K fertilisers applied to grass 1958-1967 and fresh dressings of P and K since then. The experiment was fallowed in 1973 - Harwoods Piece.

Sponsor: F.V. Widdowson.

The sixteenth year, fallow.

For previous years see 58/Cg/2(t), 59/Cg/2(t), 60/Ci/1, 61/Dg/1, 62/C/11, 63/C/7, 64/C/6(t), 65/C/6(t), 66/C/5, 67/C/4, 68/C/4(t), 69/R/CS/1(t), 70/R/CS/1(t), 71/R/CS/1(t), 72/R/CS/1.

Cultivations, etc.:- Ploughed: 21 Oct, 1972. Rotary cultivated: 26 Apr, 1973, 31 May, 2 July. Deep-tine cultivated: 27 July.

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73/R/CS/2

GRAZED REFERENCE PLOTS

Object: To study the residual effects of N, P and K fertilisers, applied 1959 - 1970, on grazed grass which now receives basal N only - Highfield IX.

Sponsor: F.V. Widdowson.

The fifteenth year, old grass.

For previous years see 64/B/11(t), 65/B/2, 66/B/2(t), 67/B/2, 68/B/3, 69-70/R/CS/2, 71/R/CS/2(t), 72/R/CS/2.

Basal application: 95 kg N as 'Nitro-Chalk'.

Cultivations, etc.:- N applied: 26 Feb, 1973.

NOTE: Grass was grazed throughout the season, yields were not taken.

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73/R/CS/6

WHEAT AFTER INTENSIVE BARLEY

Object: To study the effects of different periods of pre-cropping with barley on yields and incidence of take-all (Gaeumannomyces graminis), in wheat - Little Knott I.

Sponsors: D. Hornby, G.A. Salt.

The 13th year, winter wheat and beans.

NOTE: Only one quarter of the original experiment is continuing.

For previous years see 61/C/8(t), 62/C/7, 63-66/C/2, 67/C/2(t), 68/C/2(t), 69/R/CS/6(t), 70/R/CS/6(t), 71/R/CS/6(t) and 72/R/CS/6(t).

Design: 2 replicates of 10 plots fully randomised.

Whole plot dimensions: 4.27 x 20.1. Plot area harvested: 0.00572.

Treatments: Crop sequence (1961-73):-

													CROPSEQN
O	BE	B	B	B	B	B	B	WW	F	WW	WW	WW	1
WS	O	BE	B	B	B	B	B	WW	WW	WW	F	WW	2
O	WS	O	BE	B	B	B	B	WW	WW	WW	F	BE	3
BE	O	WS	O	BE	B	B	B	WW	WW	WW	WW	F	4
WS	BE	O	WS	O	BE	B	B	WW	WW	WW	WW	WW	5
WS	WS	BE	O	WS	O	BE	B	WW	WW	WW	WW	WW	6
B	B	B	B	B	B	B	B	WW	WW	WW	WW	WW	7
WS	WS	WS	WS	WS	WS	WS	WS	WW	WW	WW	WW	WW	8
WS	WW	WW	WW	WW	WW	WW	F	WW	WW	WW	WW	WW	9
BE	WW	P	B	BE	WW	P	B	F	WW	WW	WW	WW	10

where: B = barley, WS = spring wheat, WW = winter wheat, BE = beans, O = oats, P = potatoes, F = fallow.

Basal applications: Ground chalk was applied at 10.0 tonnes to equalise the previous test on half plots together with a basal application at 2.5 tonnes. Wheat: Manures: (0:14:28) at 250 kg, combine drilled, 'Nitro-Chalk' at 500 kg. Weedkillers: Terbutryne and related triazines ('Prebane 50' at 4.5 kg in 220 l) and MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 220 l). Beans: Manures: (0:14:28) at 400 kg, placement drilled. Insecticide: Phorate at 1.1 kg as granules.

Seed: Wheat: Cappelle, sown at 200 kg.
Beans: Minor, sown at 220 kg.

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Cultivations, etc.:- Chalk applied: 21 Sept, 1972. Ploughed: 27 Sept.
Wheat: Seed sown: 13 Oct. 'Prebane' applied: 21 Oct. N applied: 12 Apr, 1973. 'Tetralex Plus' applied: 16 Apr. Combine harvested: 20 Aug.
Beans: Power harrowed, seed sown: 9 Mar, 1973. Insecticide applied: 11 June. Combine harvested: 11 Sept.
Fallow: Power harrowed: 9 Mar, 1973. Rotary cultivated: 6 June.

NOTES (1) Yields were taken for winter wheat only.
(2) Soil and plant samples were taken at monthly intervals for disease assessment, chemical and microbial analyses and further culture.

Standard error per plot. Winter wheat:
Grain, tonnes/hectare: 0.246 or 4.5% (8 d.f.)

TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

CROPSEQN

1	2	5	6	7	8	9	10	Mean
5.72	3.92	6.01	5.42	5.39	5.94	5.89	5.70	5.50

STANDARD ERROR OF DIFFERENCES

CROPSEQN

0.246

Mean D.M. % 86.7

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73/R/CS/10 and 73/W/CS/10

LONG TERM LIMING

Object: To study the effects of different amounts of lime on the yields of a range of crops. The effects of P and K are also studied - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

Sponsors: J. Bolton, D.B. Slope.

The twelfth year, barley.

For previous years see 'Details' 1967, 68/C/3(t), 69/R&W/CS/10, 70/R&W/CS/10(t) and 71-72/R&W/CS/10.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3. Area harvested: Sawyers I (R): 0.00512. Stackyard C (W): 0.00518.

Treatments: All combinations of:-

1. Ground chalk (tonnes $CaCO_3$) (total applied 1962-63):

Rothamsted (R)	Woburn (W)	LIME R	LIME W
None	None	0	0
5	5	5	5
10	12	10	12
20	19	20	19

2. Phosphate, applied annually as superphosphate (kg P_2O_5):

	P_2O_5
None	0
63	63

3. Potassium, applied annually as muriate of potash (kg K_2O):

	K_2O
None	0
126	126

Basal applications:

Sawyers I (R): Manures: 90 kg N as 'Nitro-Chalk' combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Stackyard C (W): Manures: 130 kg N as 'Nitro-Chalk' broadcast before sowing. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 280 l.

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73/R/CS/10 and 73/W/CS/10

Seed: Sawyers I (R): Julia, dressed with ethirimol, sown at 160 kg.
Stackyard C (W): Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Sawyers I (R): Ploughed: 29 Nov, 1972. P and K applied: 26 Feb, 1973. Power harrowed, seed sown: 12 Mar. Weedkiller applied: 15 May. Plots without lime rotary cultivated: 2 July. Combine harvested: 10 Aug.
Stackyard C (W): Deep-tine cultivated: 28 Sept, 1972. Ploughed: 27 Dec. P and K applied: 28 Feb, 1973. N applied: 8 Mar. Seed sown: 12 Mar. Weedkiller applied: 11 May. Certain plots without lime rotary cultivated: 2 July. Combine harvested: 13 Aug.

NOTE: Plots which had received no lime grew little crop and became very weedy. At Rothamsted all these plots were cut green in July, no yields, and rotary cultivated. At Woburn yields were taken from combinations of no lime with P and K together (both blocks) and with P alone (one block only), the remaining plots with no lime were cut green in July and rotary cultivated.

Standard errors per plot. Grain, tonnes/hectare:
Sawyers I (R): 0.910 or 23.0% (11 d.f,)
Stackyard C (W): 0.476 or 11.4% (11 d.f.)

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73/R/CS/10 and 73/W/CS/10

TABLES OF MEANS

GRAIN: TONNES/HECTARE

SAWYERS I (R)

	LIME 5	10	20	Mean
P205				
0	2.17	3.04	3.55	2.92
63	4.31	5.09	5.59	4.99
K20				
0	2.91	3.83	4.12	3.62
126	3.57	4.30	5.02	4.30
Mean	3.24	4.07	4.57	3.96

	P205 0	63
K20		
0	2.59	4.65
126	3.26	5.34

LIME	5		10		20	
K20	0	126	0	126	0	126
P205						
0	2.45	1.90	2.68	3.41	2.65	4.46
63	3.38	5.24	4.98	5.19	5.59	5.58

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73/R/CS/10 and 73/W/CS/10

GRAIN: TONNES/HECTARE

STACKYARD C (W)

	LIME 5	12	19	Mean
P205				
0	2.85	3.59	4.50	3.64
63	4.49	4.75	4.96	4.73
K20				
0	3.49	4.35	4.62	4.15
126	3.85	3.99	4.84	4.23
Mean	3.67	4.17	4.73	4.19

	P205 0	63
K20		
0	3.64	4.66
126	3.64	4.81

LIME	5		12		19	
K20	0	126	0	126	0	126
P205						
0	2.67	3.03	3.98	3.20	4.29	4.70
63	4.31	4.67	4.73	4.78	4.95	4.97

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73/R/CS/10 and 73/W/CS/10

GRAIN: TONNES/HECTARE

SAWYERS I (R)

STANDARD ERRORS OF DIFFERENCES

LIME	P2O5	K2O	LIME P2O5	LIME K2O	P2O5 K2O	LIME P2O5 K2O
0.455	0.371	0.371	0.643	0.643	0.525	0.910

Mean D.M. % 81.3

GRAIN: TONNES/HECTARE

STACKYARD C (W)

STANDARD ERRORS OF DIFFERENCES

LIME	P2O5	K2O	LIME P2O5	LIME K2O	P2O5 K2O	LIME P2O5 K2O
0.238	0.194	0.194	0.337	0.337	0.275	0.476

Mean D.M. % 83.4

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73/R/CS/10 and 73/W/CS/10

STRAW: TONNES/HECTARE

SAWYERS I (R)

	LIME 5	10	20	Mean
P205				
0	3.01	4.10	4.75	3.95
63	6.15	6.17	7.45	6.59
K20				
0	4.08	4.52	4.93	4.51
126	5.08	5.75	7.27	6.03
Mean	4.58	5.13	6.10	5.27

	P205 0	63
K20		
0	3.30	5.72
126	4.61	7.46

LIME	5		10		20	
K20	0	126	0	126	0	126
P205						
0	3.44	2.57	3.56	4.64	2.89	6.61
63	4.72	7.58	5.47	6.87	6.97	7.94

Mean D.M. % 93.6

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73/R/CS/10 and 73/W/CS/10

STRAW: TONNES/HECTARE

STACKYARD C (W)

	LIME 5	12	19	Mean
P205				
0	2.02	2.20	3.03	2.42
63	3.23	3.62	3.52	3.46
K20				
0	2.14	2.65	2.70	2.50
126	3.11	3.17	3.85	3.38
Mean	2.63	2.91	3.27	2.94

	P205 0	63
K20		
0	2.21	2.78
126	2.62	4.13

LIME	5		12		19	
K20	0	126	0	126	0	126
P205						
0	1.86	2.18	2.35	2.06	2.43	3.63
63	2.43	4.04	2.95	4.28	2.97	4.07

Mean D.M. % 93.7

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73/W/CS/11

SOIL STRUCTURE

Object: To study the residual effects of peat, at a range of nitrogen levels, on the yield of potatoes - Woburn Stackyard II.

Sponsor: A.E. Johnston.

The eleventh year, potatoes.

For previous years see 64/C/20(t), 65/C/19(t), 66/C/11(t), 67/C/8(t), 68/C/31(t), 69/W/CS/11(t), 70/W/CS/11(t), 71/W/CS/11 and 72/W/CS/11(t).

Design: Single replicate of 5 x 4. Levels of peat in 4 randomised blocks of 5 plots.

Whole plot dimensions: 2.13 x 3.05. Area harvested: 0.00065.

Treatments: All combinations of:-

1. Peat (tonnes dry matter - total applied 1963-72):

	PEAT
None	0
8	8
55	55
110	110
165	165

2. Nitrogen fertiliser (kg N)

	N
None	0
100	100
200	200
300	300

Basal applications: Manures: Ground chalk at 2.5 tonnes. P at 85 kg, as triple superphosphate, K at 300 kg, as potassium bicarbonate, Mg at 55 kg as magnesium sulphate. Weedkiller: Linuron at 0.85 kg with paraquat at 0.42 kg ion in 340 l. Insecticide: Menazon at 0.28 kg in 340 l. Insecticide with fungicide: Menazon at 0.28 kg plus mancozeb at 1.3 kg in 340 l.

Seed: Pentland Crown.

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Cultivations, etc.:- Ground chalk applied, plots dug by hand: 28 Nov, 1972. P, K and Mg applied, plots rotary cultivated and potatoes planted: 6 Apr, 1973. Weedkiller applied: 9 May. Insecticide applied: 15 June. Insecticide with fungicide applied: 18 June. Lifted: 25 Sept.

NOTE: Soil samples were taken at harvest for analysis of P and K.

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

PEAT

N	0	8	55	110	165	Mean
0	34.8	36.2	36.5	35.9	35.1	35.7
100	48.2	54.2	53.3	57.9	54.5	53.6
200	63.3	56.5	60.5	72.8	67.3	64.1
300	59.1	65.3	83.0	81.1	83.6	74.4
Mean	51.3	53.0	58.3	61.9	60.1	56.9

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73/R/CS/13

N LEVELS TO OLD GRASS

Object: To study the effects of a range of nitrogen rates on yield and botanical composition of very old permanent pasture given a single dressing of P and K annually. N fixed by legumes is estimated and the effect of treatments on nutrients available in the soil is also studied - Park Grass Old Plot 6.

Sponsors: A.E. Johnston, R.C. Flint.

The ninth year, old grass.

For previous years see 65/C/33(t), 66/C/14, 67/C/10(t), 68/C/8(t), 69/R/CS/13(t), 70/R/CS/13(t), 71/R/CS/13, 72/R/CS/13(t).

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 1.83 x 10.1. Area harvested: 0.00090.

Treatments: Fertiliser nitrogen (kg N-total per annum applied in four equal dressings as 'Nitro-Chalk'):

	TOTAL N
None (sprayed with mecoprop to control legumes, two plots per block)	0(S)
None (two plots per block)	0
75	75
150	150
225	225
300	300
375	375
450	450

NOTE: Mecoprop applied 18 Apl, 16 July as 'Clovotox' at 11.2 l in 340 l.

Basal applications: 34 kg P as superphosphate, 224 kg K as potassium sulphate, 11 kg Mg as magnesium sulphate.

Cultivations, etc.:- Basal P K Mg applied: 8 Dec, 1972. Cut: 16 May, 1973, 27 June, 7 Aug, 9 Oct. N applied: 2 Mar and then after each cut except the last.

Standard errors per plot. Dry matter, tonnes/hectare:

1st cut:	0.221	or 9.4% (29 d.f.)
2nd cut:	0.265	or 9.9% (29 d.f.)
3rd cut:	0.196	or 9.4% (29 d.f.)
4th cut:	0.163	or 12.1% (29 d.f.)
Total of 4 cuts:	0.462	or 5.5% (29 d.f.)

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73/R/CS/13

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

TOTAL N

O(S)	0	75	150	225	300	375	450	Mean
0.31	1.39	1.37	2.00	2.82	4.00	4.87	5.13	2.36

STANDARD ERRORS OF DIFFERENCES

TOTAL N

O(S) v O	0.111
Between any of remainder	0.156
O(S) or O v any of remainder	0.135

2ND CUT

0.78	3.02	2.69	2.78	3.26	3.59	3.35	3.41	2.67

STANDARD ERRORS OF DIFFERENCES

TOTAL N

O(S) v O	0.133
Between any of remainder	0.187
O(S) or O v any of remainder	0.162

Mean D.M. % 1st cut 23.8
2nd cut 18.0

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73/R/CS/13

DRY MATTER: TONNES/HECTARE

3RD CUT

TOTAL N

O(S)	0	75	150	225	300	375	450	Mean
0.42	1.87	1.94	2.41	2.49	3.17	3.03	3.33	2.10

STANDARD ERRORS OF DIFFERENCES

TOTAL N

O(S) v O	0.098
Between any of remainder	0.139
O(S) or O v any of remainder	0.120

4TH CUT

0.42	1.30	1.32	1.63	1.61	1.69	1.83	1.92	1.35

STANDARD ERRORS OF DIFFERENCES

TOTAL N

O(S) v O	0.082
Between any of remainder	0.115
O(S) or O v any of remainder	0.100

Mean D.M. % 3rd cut 19.8
4th cut 22.8

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73/R/CS/13

DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

TOTAL N

O(S)	0	75	150	225	300	375	450	Mean
1.93	7.58	7.32	8.82	10.19	12.46	13.08	13.79	8.47

STANDARD ERRORS OF DIFFERENCES

TOTAL N

O(S) v 0	0.231
Between any of remainder	0.327
O(S) or 0 v any of remainder	0.283

Mean D.M. % 21.1

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73/R/CS/14

NPK TO OLD GRASS

Object: To study the effects of a range of P and K levels on yields of permanent pasture on sites with much or little P and K in the soil - Park Grass Old Plots 5/1 and 5/2.

Sponsor: A.E. Johnston.

The ninth year, old grass.

For previous years see 65/C/22(t), 66/C/13(t), 67/C/9(t), 68/C/7 and 69-72/R/CS/14.

Design: On each site:- A single replicate of 2 x 4 x 4 in 2 blocks of 16 plots each, with 2 x 2 additional plots in each block.

Whole plot dimensions: 1.83 x 10.1. Area harvested: 0.00090.

Treatments:

The experiment is duplicated on sites differing in previous history:-

	PLOT
Park Grass Plot 5/1: No P or K 1856-1964	5/1NORES
Park Grass Plot 5/2: Superphosphate to supply 34 kg P, sulphate of potash to supply 224 kg K. Annually 1856-1964	5/2PKRES

On each site, all combinations of:-

1. Nitrogen fertiliser (kg N for each cut): NPERCUT

33.6	33.6
67.2	67.2

2. Phosphate (kg P) as superphosphate annually: P

None	0
16.8	16.8
33.6	33.6
67.2	67.2

3. Potassium (kg K) as potassium chloride annually: K

None	0
112	112
224	224
448	448

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together with extra treatments, all combinations of:-

1. Nitrogen fertiliser (kg N for each cut):	NPERCUT
33.6	33.6
67.2	67.2
2. Residues of PK fertilisers applied 1965 only:	PKRES65
33.6 kg P, 56 kg K	34P56K
33.6 kg P, 336 kg K	34P336K

Cultivations, etc.:- P and K applied: 8 Dec, 1972. Cut: 4 June, 1973, 24 July, 9 Oct. N applied: 2 Mar and after first two cuts.

Standard errors per plot. Dry matter, tonnes/hectare:

Plot 5/1:	1st cut:	0.332 or 10.3% (11 d.f.)
	2nd cut:	0.216 or 11.2% (11 d.f.)
	3rd cut:	0.168 or 17.9% (11 d.f.)
	Total of 3 cuts:	0.572 or 9.4% (11 d.f.)
Plot 5/2:	1st cut:	0.433 or 10.5% (11 d.f.)
	2nd cut:	0.429 or 15.2% (11 d.f.)
	3rd cut:	0.208 or 11.0% (11 d.f.)
	Total of 3 cuts:	0.683 or 7.7% (11 d.f.)

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73/R/CS/14

TABLES OF MEANS

PLOT 5/1: DRY MATTER, TONNES/HECTARE

1ST CUT

Excluding PKRES65 plots

	P				
	0.0	16.8	33.6	67.2	Mean
K					
0	1.96	2.63	2.84	2.86	2.57
112	2.13	4.13	4.78	4.23	3.82
224	1.90	4.96	4.15	4.64	3.91
448	1.77	4.46	4.32	4.45	3.75
NPERCUT					
33.6	1.95	3.43	3.35	3.60	3.08
67.2	1.93	4.66	4.69	4.49	3.94
Mean	1.94	4.04	4.02	4.05	3.51

	K			
	0	112	224	448
NPERCUT				
33.6	2.60	3.30	3.23	3.19
67.2	2.54	4.34	4.60	4.31

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.117	0.166	0.166	0.234	0.234	0.332

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73/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

1ST CUT

PKRES65 plots

	PKRES65 34P56K	34P336K	Mean
NPERCUT			
33.6	2.36	2.15	2.26
67.2	1.39	1.99	1.94
Mean	2.13	2.07	2.10

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.234	0.234	0.332

Grand mean 3.23
Mean D.M. % 2.45

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73/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

2ND CUT

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	1.32	1.37	1.04	0.73	1.12
112	1.99	2.13	2.11	2.20	2.11
224	2.27	2.21	2.43	2.33	2.31
448	2.17	2.29	3.87	2.49	2.71
NPERCUT					
33.6	1.81	1.99	2.16	1.96	1.98
67.2	2.06	2.01	2.57	1.92	2.14
Mean	1.94	2.00	2.36	1.94	2.06

	K 0	112	224	448
NPERCUT				
33.6	1.33	1.95	2.15	2.49
67.2	0.90	2.26	2.47	2.92

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.076	0.108	0.108	0.153	0.153	0.216

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PLOT 5/1: DRY MATTER, TONNES/HECTARE

2ND CUT

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	1.37	1.58	1.47
67.2	1.32	1.36	1.34
Mean	1.34	1.47	1.41

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.153	0.153	0.216

Grand mean 1.93
Mean D.M. % 20.6

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PLOT 5/1: DRY MATTER, TONNES/HECTARE

3RD CUT

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	0.50	0.56	0.57	0.81	0.61
112	0.79	1.09	1.21	0.93	1.01
224	0.66	1.44	1.31	1.54	1.24
448	0.70	1.30	1.55	1.63	1.30
NPERCUT					
33.6	0.67	1.15	1.01	1.23	1.02
67.2	0.66	1.05	1.31	1.23	1.06
Mean	0.66	1.10	1.16	1.23	1.04

	K 0	112	224	448
NPERCUT				
33.6	0.64	0.98	1.18	1.26
67.2	0.57	1.04	1.30	1.34

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.059	0.084	0.084	0.119	0.119	0.168

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PLOT 5/1: DRY MATTER, TONNES/HECTARE

3RD CUT

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	0.60	0.60	0.60
67.2	0.46	0.48	0.47
Mean	0.53	0.54	0.53

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.119	0.119	0.168

Grand mean 0.94
Mean D.M. % 20.5

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PLOT 5/1: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	3.78	4.56	4.45	4.40	4.30
112	4.92	7.35	8.11	7.36	6.93
224	4.83	8.61	7.89	8.51	7.46
448	4.64	8.05	9.74	8.58	7.75
NPERCUT					
33.6	4.44	6.56	6.52	6.79	6.08
67.2	4.65	7.72	8.57	7.64	7.15
Mean	4.54	7.14	7.55	7.21	6.61

	K 0	112	224	448
NPERCUT				
33.6	4.58	6.23	6.56	6.94
67.2	4.01	7.64	8.37	8.57

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.202	0.286	0.286	0.405	0.405	0.572

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PLOT 5/1: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

PKRES65 plots

	PKRES65 34P56K	34P336K	Mean
NPERCUT			
33.6	4.32	4.32	4.32
67.2	3.67	3.83	3.75
Mean	4.00	4.08	4.04

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.405	0.405	0.573

Grand mean 6.10
Mean D.M. % 21.9

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73/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

1ST CUT

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	3.55	4.25	3.69	4.06	3.89
112	4.25	4.54	4.56	4.02	4.34
224	4.04	4.30	4.35	3.80	4.12
448	3.92	4.49	3.94	4.20	4.14
NPERCUT					
33.6	3.03	3.28	3.10	2.94	3.09
67.2	4.85	5.51	5.16	5.10	5.15
Mean	3.94	4.39	4.13	4.02	4.12

	K 0	112	224	448
NPERCUT				
33.6	2.97	3.34	3.00	3.03
67.2	4.80	5.34	5.24	5.24

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.153	0.216	0.216	0.306	0.306	0.433

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PLOT 5/2: DRY MATTER, TONNES/HECTARE

1ST CUT

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	3.43	3.15	3.29
67.2	5.03	5.10	5.07
Mean	4.23	4.13	4.18

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.306	0.306	0.433

Grand mean 4.13
Mean D.M. % 26.2

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PLOT 5/2: DRY MATTER, TONNES/HECTARE

2ND CUT

Excluding PKRES65 plots

	P				
	0.0	16.8	33.6	67.2	Mean
K					
0	2.74	2.71	2.68	3.30	2.86
112	2.68	2.71	2.95	2.58	2.73
224	3.19	3.27	2.69	2.32	2.87
448	3.46	2.63	2.58	2.96	2.91
NPERCUT					
33.6	2.70	2.38	2.52	2.61	2.55
67.2	3.34	3.27	2.93	2.98	3.13
Mean	3.02	2.83	2.73	2.79	2.84

	K			
	0	112	224	448
NPERCUT				
33.6	2.61	2.63	2.47	2.50
67.2	3.10	2.84	3.27	3.31

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.152	0.215	0.215	0.303	0.303	0.429

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PLOT 5/2: DRY MATTER, TONNES/HECTARE

2ND CUT

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	2.71	2.71	2.71
67.2	2.88	2.71	2.80
Mean	2.80	2.71	2.75

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.303	0.303	0.429

Grand mean 2.83
Mean D.M. % 18.8

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PLOT 5/2: DRY MATTER, TONNES/HECTARE

3RD CUT

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	1.93	1.83	1.74	1.96	1.87
112	1.78	1.98	2.07	1.76	1.90
224	1.84	2.05	1.85	1.86	1.90
448	1.98	1.84	1.86	1.83	1.88
NPERCUT					
33.6	1.87	1.80	1.85	1.59	1.78
67.2	1.89	2.05	1.91	2.12	1.99
Mean	1.88	1.92	1.88	1.86	1.89

	K 0	112	224	448
NPERCUT				
33.6	1.64	1.88	1.77	1.82
67.2	2.09	1.91	2.03	1.93

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.074	0.104	0.104	0.147	0.147	0.208

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73/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

3RD CUT

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	1.84	1.86	1.85
67.2	2.02	2.08	2.05
Mean	1.93	1.97	1.95

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.147	0.147	0.208

Grand mean 1.90
Mean D.M. % 20.5

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73/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

Excluding PKRES65 plots

	P 0.0	16.8	33.6	67.2	Mean
K					
0	8.22	8.79	8.11	9.32	8.61
112	8.71	9.23	9.58	8.37	8.97
224	9.07	9.62	8.89	7.99	8.89
448	9.36	8.96	8.38	8.99	8.92
NPERCUT					
33.6	7.60	7.46	7.48	7.14	7.42
67.2	10.08	10.83	10.00	10.19	10.28
Mean	8.84	9.15	8.74	8.67	8.85

	K 0	112	224	448
NPERCUT				
33.6	7.22	7.85	7.24	7.36
67.2	10.00	10.09	10.54	10.48

STANDARD ERRORS OF DIFFERENCES

NPERCUT	P	K	NPERCUT P	NPERCUT K	P K
0.241	0.341	0.341	0.483	0.483	0.683

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73/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

PKRES65 plots

	PKRES65 34P56K	PKRES65 34P336K	Mean
NPERCUT			
33.6	7.98	7.72	7.85
67.2	9.94	9.89	9.91
Mean	8.96	8.81	8.88

STANDARD ERRORS OF DIFFERENCES

NPERCUT	PKRES65	NPERCUT PKRES65
0.483	0.483	0.683

Grand mean 8.85
Mean D.M. % 21.8

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73/W/CS/16

IRRIGATION AND EELWORMS

Object: To study the cumulative and residual effects of dazomet and the effects of irrigation, nitrogen and potassium fertiliser on the yield and incidence of Heterodera spp. on potatoes grown continuously. The effects of growing susceptible and resistant varieties are also studied, either grown continuously or alternated - Woburn Butt Close.

Sponsors: F.G.W. Jones, K. Evans, T.M. Addiscott.

The eighth year, potatoes.

For previous years see 66/C/32(t), 67/C/25, 68/C/19, 69/W/CS/16(t), 70-71/W/CS/16 and 72/W/CS/16(t).

Design:
Series I: 3 blocks of 4 plots, residues of sequences of varieties on strips of 2 half plots, residues of fumigants on quarter plots and fertilisers on eighth plots.
Series IV: 3 blocks of 4 plots, sequences of varieties on strips of 2 half plots, dazomet on quarter plots.

Whole plot dimensions: 6.48 x 7.11. Area harvested: Series I and IV: 0.00092.

Treatments: To Series I. All combinations of:-

Whole plots: 1. Irrigation: IRRIGN

None	None
Full	Full

Strips of half plots: 2. Previous cropping with potatoes resistant (R) or susceptible (S) to potato cyst nematode (all susceptible in 1973): PREVCROP

1966	1967	1968	1969	1970	1971	1972	
R	R	R	R	R	R	S	R/R/R/S
S	R	S	R	S	R	S	R/S/R/S
S	S	S	S	S	S	S	S/S/S/S
R	S	R	S	R	S	S	S/R/S/S

Quarter plots: 3. Residues of fumigants applied 1966-71: FUMRESID

None	None
DD (1966-68): dazomet (1969-71)	DD/Daz.

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Eighth plots: 4. Nitrogen fertiliser (kg N): N

164 supplied by basal (13:13:20)	164
328 supplied by basal (13:13:20) plus 'Nitro-Chalk'	328

5. Potassium fertiliser (kg K20): K20

250 supplied by basal (13:13:20)	250
500 supplied by basal (13:13:20) plus muriate of potash	500

Treatments: To Series IV. All combinations of:-

Whole plots: 1. Irrigation: IRRIGN

None	None
Full	Full

Strips of half plots: 2. Cropping sequence with potatoes resistant (R) and susceptible(S) to potato cyst nematode: CROPSEQN

1966	1967	1968	1969	1970	1971	1972	1973	
R	R	R	R	R	R	R	R	R/R/R/R
R	S	R	S	R	S	R	S	R/S/R/S
S	S	S	S	S	S	S	S	S/S/S/S
S	R	S	R	S	R	S	R	S/R/S/R

Quarter plots: 3. Dazomet (kg) applied cumulatively to previous fumigant treatments: DAZOMET

0	0
224	224

Irrigation treatments 1973 (mm water):

	Series I		Series IV
12 June	12.7	8 June	12.7
15 June	12.7	15-21 June	12.7
10 July	12.7	11 July	12.7
23 July	12.7	25 July	12.7
2 Aug	12.7	1 Aug	12.7
Total	63.5		63.5

Basal applications: Manures: Magnesian limestone at 7.5 tonnes. (13:13:20) at 1280 kg, Series I and 1510 kg, Series IV. Weedkiller: Linuron at 1.2 kg wth paraquat at 0.42 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l. Haulm desiccant: Diquat at 0.5 kg ion in 370 l.

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Varieties: Series I: Pentland Dell.
Series IV: Pentland Dell (susceptible), Maris Piper (resistant).

Cultivations, etc.:-
Series I: Deep-tine cultivated: 25 Sept, 1972. Magnesian limestone applied: 3 Oct. Ploughed: 21 Dec. NPK applied: 28 Mar, 1973. N and K treatments applied: 10 Apr. Rotary cultivated, potatoes planted: 11 Apr. Weedkiller applied: 14 May. Grubbed: 1 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 27 July. Haulm mechanically destroyed, diquat applied: 22 Aug. Lifted: 10 Sept.
Series IV: Deep-tine cultivated: 27 Sept, 1972. Magnesian limestone applied: 3 Oct. Dazomet applied, rotary cultivated: 6 Nov. Ploughed: 4 Jan, 1973. NPK applied: 27 Mar. Rotary cultivated, potatoes planted: 9 Apr. Weedkiller applied: 14 May. Grubbed: 1 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 27 July. Haulm mechanically destroyed, diquat applied: 22 Aug. Lifted: 11 Sept.

NOTES: (1) Soil samples were taken before planting and after lifting for egg and cyst counts of Heterodera spp. and larval invasion tests.
(2) Weekly observations were made of water potential and stomatal resistance of leaves and water content of the soil to a depth of 60 cm on Series IV.
(3) Plant samples were taken at fortnightly intervals to measure leaf areas, fresh and dry weights of haulm, fresh weights of roots and new tubers and to determine percentage P, K, Ca, Mg and Na in the haulm.
(4) Series I. The whole area was infested by Potato Cyst Nematode and (in the absence of soil fumigation) all yields were poor. Therefore the potatoes were not graded and standard errors for total tubers are not presented.

Standard errors per plot. Total tubers, tonnes/hectare:
Series IV. Pooled whole and half plot: 4.65 or 34.6% (14 d.f.)
Quarter plot: 4.30 or 32.0% (16 d.f.)

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73/W/CS/16

TABLES OF MEANS

SERIES I

TOTAL TUBERS: TONNES/HECTARE

	PREVCROP R/R/R/S	R/S/R/S	S/S/S/S	S/R/S/S	Mean
IRRIGN					
None	4.9	2.2	2.9	1.9	3.9
Full	2.6	1.0	1.8	0.7	1.5
FUMRESID					
None	2.9	1.3	1.9	1.3	1.8
DD/Daz	4.5	2.0	2.8	1.2	2.6
N					
164	2.9	1.0	2.1	1.1	1.8
328	4.5	2.3	2.6	1.4	2.7
K2O					
250	3.8	1.6	2.4	1.4	2.3
500	3.6	1.7	2.3	1.1	2.2
Mean	3.7	1.6	2.3	1.3	2.2

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73/W/CS/16

SERIES IV

	CROPSEQN R/R/R/R	R/S/R/S	S/S/S/S	S/R/S/R	Mean
	TOTAL TUBERS: TONNES/HECTARE				
IRRIGN					
None	21.1	11.3	6.1	14.4	13.2
Full	18.9	12.5	8.9	14.3	13.6
DAZOMET					
0	10.6	4.6	0.9	6.5	5.6
224	29.5	19.2	14.2	22.1	21.2
Mean	20.0	11.9	7.5	14.3	13.4

STANDARD ERRORS OF DIFFERENCES

CROPSEQN	DAZOMET	CROPSEQN* IRRIGN	CROPSEQN DAZOMET
2.68	1.24	3.80	3.21
Except when comparing means with same level of CROPSEQN			2.48

* Within the same level of IRRIGN only

	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
IRRIGN					
None	73.0	59.5	47.2	70.7	62.6
Full	63.2	60.3	41.7	73.7	59.8
DAZOMET					
0	52.9	40.6	16.1	63.1	43.2
224	83.3	79.2	72.9	81.3	79.2
Mean	68.1	59.9	44.5	72.2	61.2

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73/R/CS/24

PK AND TAKE-ALL

Object: To study the effects of different amounts of phosphate, potash and nitrogen fertiliser on the yields and incidence of take-all (Gaeumannomyces graminis) in continuous barley - West Barnfield II.

Sponsors: G.E.G. Mattingly, D.B. Slope.

The sixth year, barley.

For previous years see 68/C/16(t), 69/R/CS/24, 70/R/CS/24(t) and 71-72/R/CS/24.

Design: 4 randomised blocks of 10 plots split into 2.

Whole plot dimensions: 5.33 x 20.1. Sub-plot area harvested: 0.00273.

Treatments: All combinations of:-

Whole plots: 1. Phosphate (kg P2O5) as superphosphate:

	P2O5
None	0
37.5 annually	37.5A
150 annually	150A
226 six-yearly, last applied autumn 1967	226-6YR
904 six-yearly, last applied autumn 1967	904-6YR

2. Potassium (kg K2O) annually as muriate of potash:

	K2O
37.5	37.5
150	150

Sub plots: 3. Nitrogen (kg N) as 'Nitro-Chalk':

	N
37.5	37.5
75.0	75.0
113	113
150	150

Basal applications: Weedkillers: Paraquat, 0.56 kg ion in 220 l and MCPA, mecoprop and dicamba ('Tetralex plus' 7.0 l in 220 l).

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Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Paraquat applied: 26 Sept, 1972. Ploughed: 27 Nov. P and K treatments applied: 27 Feb, 1973. N treatments applied, seed sown: 15 Mar. 'Tetralex plus' applied: 16 May. Combine harvested: 10 Aug.

NOTES: (1) Samples were taken in May and July for estimation of incidence of root rotting disease. Soil samples were taken in the autumn for P and K analyses.

(2) Due to an error at harvest the yields of grain from two plots

	P_2O_5	K_2O	N
226R		37.5	113
		and	
150A		37.5	113

could not be separated. Estimated values were used in the analysis.

Standard error per plot. (Pooled, whole and half plot).
Grain, tonnes/hectare: 0.383 or 9.4% (35 d.f.)

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73/R/CS/24

TABLES OF MEANS

GRAIN: TONNES/HECTARE

P205

	0	37.5A	150A	226-6YR	904-6YR	Mean
K20						
37.5	2.80	4.16	4.83	3.30	4.50	3.92
150	3.34	4.58	4.78	3.69	4.59	4.20
N						
37.5	3.21	4.28	4.90	3.69	4.81	4.18
75.0	2.78	4.48	5.09	3.37	4.85	4.11
113	3.39	4.50	4.73	3.74	4.75	4.22
150	2.92	4.23	4.51	3.17	3.76	3.72
Mean	3.07	4.37	4.81	3.49	4.54	4.06

N

	37.5	75.0	113	150
K20				
37.5	3.99	4.08	4.04	3.51
150	4.34	4.17	4.38	3.95

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73/R/CS/24

GRAIN: TONNES/HECTARE

K20	37.5					150				
P205	0	37.5A	150A	226-6YR	904-6YR	0	37.5A	150A	226-6YR	904-6YR
N										
37.5	3.02	4.03	4.95	3.25	4.68	3.43	4.56	4.60	4.16	4.97
75.0	2.78	4.22	5.08	3.23	5.10	2.80	4.76	5.14	3.53	4.63
113	2.73	4.41	4.74	3.44	4.87	4.08	4.62	4.74	3.78	4.66
150	2.74	4.05	4.34	3.04	3.40	3.12	4.44	4.71	3.34	4.15

STANDARD ERRORS OF DIFFERENCES

P205	K20	N	P205 K20	P205 N	K20 N	P205 K20 N
0.136	0.087	0.122	0.192	0.272	0.174	0.404

Mean D.M. % 82.3

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73/R/CS/24

STRAW: TONNES/HECTARE

P2O5

	0	37.5A	150A	226-6YR	904-6YR	Mean
K2O						
37.5	2.11	2.78	3.38	2.01	3.02	2.66
150	2.59	3.29	3.79	2.45	3.38	3.10
N						
37.5	2.33	2.79	2.89	2.32	3.03	2.67
75.0	2.33	2.98	3.91	2.09	3.43	2.95
113	2.65	3.35	3.77	2.29	3.41	3.09
150	2.09	3.03	3.77	2.23	2.94	2.81
Mean	2.35	3.04	3.59	2.23	3.20	2.88

N

	37.5	75.0	113	150
K2O				
37.5	2.48	2.70	2.94	2.51
150	2.86	3.19	3.24	3.11

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73/R/CS/24

STRAW: TONNES/HECTARE

K2O		37.5					150				
P2O5	0	37.5A	150A	226-6YR	904-6YR	0	37.5A	150A	226-6YR	904-6YR
N											
37.5	2.10	2.61	2.88	2.11	2.72	2.55	2.98	2.91	2.52	3.33
75.0	2.08	2.59	3.44	1.89	3.51	2.58	3.36	4.38	2.28	3.34
113	2.25	3.10	3.61	2.29	3.47	3.05	3.61	3.94	2.28	3.35
150	2.01	2.84	3.59	1.76	2.38	2.17	3.22	3.95	2.71	3.49

Mean D.M. % 88.0

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73/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of Heterodera rostochiensis and yield of potatoes, residual effects of previous treatments are studied in sugar beet and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The fifth year, potatoes, sugar beet, barley.

For previous years see 71/W/CS/34(t) and 72/W/CS/34(t).

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: Potatoes - 0.00130, sugar beet - 0.00130, barley - 0.00260.

Treatments: The experiment has four series with the following cropping:-

	1969	1970	1971	1972	1973
Series I	P	P	P*	SB	B
Series II	P	P	P	P*	SB
Series III	P	B	P	P	P*
Series IV	P	B	P	P	P

P = potatoes, SB = sugar beet, B = barley.

* Treatments applied to potatoes, later crops test residual effects.

Treatments to barley (Series I) and sugar beet (Series II): All combinations of:-

1. Nematicides:

	Barley - NEMACIDE(71)	Sugar beet - NEMACIDE(72)
Aldicarb		Aldicarb
Du Pont 1410		Dupont
Nemacur P (series I only)		Nemacur
CGA 10576 (series II only)		CGA

2. Rates of nematicide (kg a.i.): RATE

2.8	2.8
5.6	5.6
11.2	11.2
together with one untreated plot per block	0.0

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Treatments to potatoes (Series III): All combinations of:-

1. Nematicides:	NEMACIDE(73)
Benomyl	Benomyl
Du Pont 1410	Dupont
Dowco 275	Dowco
2. Rates of nematicide (kg a.i.):	RATE
Single rate (2.8 Du Pont 1410, Dowco 275: 5.6 benomyl)	Single
Double rate (5.6 Du Pont 1410, Dowco 275: 11.2 benomyl)	Double
Quadruple rate (11.2 Du Pont 1410, Dowco 275: 22.4 benomyl)	Quad
together with one untreated plot per block	0.0

Basal applications:
Potatoes: Test and preparatory crop: Manures: (13:13:20) at 1830 kg. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.
Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 730 kg, N at 190 kg as 'Nitro-Chalk'. Boron at 7.4 kg B_2O_3 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Weedkiller: Phenmedipham at 1.6 kg in 280 l.
Barley: Manures: (20:15:15) at 500 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l.

Seed: Potatoes: Pentland Crown.
Sugar beet: Klein E, sown at 8.0 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Potatoes, Test crop: Ploughed: 18 Dec, 1972. NPK applied: 26 Mar, 1973. Treatments applied, all plots rotary cultivated: 30 Mar. Potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May. Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 12 Sept. Lifted: 20 Sept.

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Potatoes, Preparatory crop: Ploughed: 19 Dec, 1972. NPK applied: 26 Mar, 1973. Rotary cultivated, potatoes planted: 3 Apr. Weedkiller applied: 9 May. Grubbed: 31 May. Rotary ridged: 25 June. Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 23 Aug. Lifted: 13 Sept.
Sugar beet: Magnesian limestone applied: 17 Nov, 1972. Ploughed: 18 Dec. PK and N applied: 20 Mar, 1973. Power harrowed, seed sown: 21 Mar. Weedkiller applied: 15 May. Singled: 21-24 May. Boron and insecticide applied: 25 June. Lifted: 9 Nov.
Barley: Ploughed: 18 Dec, 1972. Seed sown: 12 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 10 Aug.

NOTE: Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of Heterodera rostochiensis.

Standard errors per plot.

Potatoes, Total tubers, tonnes/hectare:	3.38 or 17.0% (18 d.f.)
Sugar beet, Roots (washed), tonnes/hectare:	2.37 or 5.9% (18 d.f.)
Total sugar, tonnes/hectare:	0.425 or 5.7% (18 d.f.)
Barley, Grain, tonnes/hectare:	0.318 or 6.6% (18 d.f.)

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73/W/CS/34

TABLES OF MEANS

POTATOES SERIES III

NEMACIDE(73)	RATE Single	Double	Quad	Mean
	TOTAL TUBERS: TONNES/HECTARE			
Benomyl	14.4	10.9	15.0	13.4
Dupont	29.4	31.9	31.3	30.8
Dowco	15.8	19.1	22.3	19.1
Mean	19.9	20.6	22.9	21.1

RATE 0.0 9.0
Grand mean 19.9

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(73)	RATE	NEMACIDE(73) RATE & RATE 0.0
1.59	1.59	2.76

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(73)				
Benomyl	83.9	77.5	83.0	81.5
Dupont	87.1	86.2	86.6	86.6
Dowco	84.3	88.1	83.8	85.4
Mean	85.1	84.0	84.5	84.5

RATE 0.0 75.8

Grand mean 83.6

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73/W/CS/34

SUGAR BEET SERIES II

ROOTS (WASHED): TONNES/HECTARE

	RATE 2.8	5.6	11.2	Mean
NEMACIDE(72)				
Aldicarb	40.7	38.3	42.4	40.5
Dupont	41.5	39.2	38.1	39.6
CGA	42.2	39.7	40.4	40.8
Mean	41.5	39.1	40.3	40.3

RATE 0.0 41.0

Grand mean 40.4

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(72)	RATE	NEMACIDE(72) RATE & RATE 0.0
1.12	1.12	1.93

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73/W/CS/34

SUGAR BEET SERIES.II

RATE

NEMACIDE(72)	2.8	5.6	11.2	Mean
	SUGAR PERCENTAGE			
Aldicarb	18.3	18.7	18.4	18.5
Dupont	18.5	18.4	18.5	18.5
CGA	18.4	18.4	18.5	18.4
Mean	18.4	18.5	18.5	18.4

RATE 0.0 18.2

Grand mean 18.4

TOTAL SUGAR: TONNES/HECTARE

NEMACIDE(72)				
Aldicarb	7.47	7.15	7.81	7.48
Dupont	7.66	7.23	7.05	7.31
CGA	7.76	7.29	7.45	7.50
Mean	7.63	7.22	7.44	7.43

RATE 0.0 7.47

Grand mean 7.43

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(72)	RATE	NEMACIDE(72) RATE & RATE 0.0
0.201	0.201	0.347

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73/W/CS/34

BARLEY SERIES I

NEMACIDE(71)	RATE 2.8	5.6	11.2	Mean
	GRAIN: TONNES/HECTARE			
Aldicarb	5.04	4.85	5.17	5.02
Dupont	4.71	4.87	4.74	4.78
Nemacur	4.50	4.51	5.19	4.73
Mean	4.75	4.74	5.03	4.84

RATE 0.0 4.57

Grand mean 4.82

STANDARD ERRORS OF DIFFERENCES

NEMACIDE(71)	RATE	NEMACIDE(71) RATE & RATE 0.0
0.150	0.150	0.259

NEMACIDE(71)	STRAW: TONNES/HECTARE			
Aldicarb	4.32	3.69	4.46	4.16
Dupont	3.97	4.10	4.02	4.03
Nemacur	3.90	3.80	4.37	4.03
Mean	4.06	3.86	4.29	4.07

RATE 0.0 3.65

Grand mean 4.03

Mean D.M. % Grain: 84.6
Straw: 89.3

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73/W/CS/35

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on Heterodera rostochiensis and yield of potatoes and the residual effects on yield of sugar beet - Woburn Stackyard AII.

Sponsor: A.G. Whitehead.

The sixth year of continuous potatoes - second year of treatments. Sugar beet tests residues.

For previous year see 72/W/CS/35(t).

Design: 3 series of 4 replicates of 2 x 9.

Whole plot dimensions: 4.27 x 6.10. Areas harvested: Potatoes - 0.00087, Sugar beet - 0.00146.

Treatments:-
The experiment has three series with the following cropping:-

	1968-71	1972	1973
Series I	P	P*	SB
Series II	P	P	P*
Series III	P	P	P

P = Potatoes, SB = Sugar beet

* Treatments applied to potatoes, later crops test residual effects.

Treatments to Series I (1972) and Series II (1973): All combinations of:-

1. Varieties

	VARIETY
Maris Piper	Piper
Pentland Crown	Crown

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2. Nematicides (kg)	NEMACIDE
None	None
Dazomet (half before, half after autumn ploughing)	
220	Daz2
330	Daz3
440	Daz4
660	Daz6
Dazomet, 220, 'Telone', 220, all after autumn ploughing	Daz2/Te2
'Telone' 450 after autumn ploughing	Te4
'DuPont 1410', 5.6 a.i. in spring	DuP
'Telone' 220, after autumn ploughing, 'DuPont 1410' 5.6 a.i. in spring	Te2/DuP

Sugar beet tests residual effects of potato varieties (RESVAR) and nematicides (RESNEM).

Basal applications:-

Potatoes: Test and preparatory crop: Manures: (13:13:20) at 1830 kg. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

Sugar beet: Manures: Magnesian limestone at 5.0 tonnes. (0:14:28) at 730 kg. N at 190 kg as 'Nitro-Chalk'. Boron at 7.4 kg B2O3 (as 'Solubor') applied with insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 450 l. Weedkiller: Phenmedipham at 1.6 kg in 280 l.

Seed: Sugar beet: Klein E, sown at 8 kg.
Potatoes: Series II: Maris Piper and Pentland Crown.
Series III: Pentland Crown.

Cultivations, etc.:-

Potatoes: Test crop: Deep-tine cultivated: 18 Sept, 1972. Dazomet applied, all plots rotary cultivated and ploughed: 18 Oct. Dazomet applied, all plots rotary cultivated, 'Telone' applied, all plots harrowed: 19 Oct. NPK applied: 26 Mar, 1973. 'DuPont 1410' applied, rotary cultivated: 3 Apr. Potatoes planted: 5 Apr. Inter-row rotary cultivated and earthed up: 6 Apr. Weedkiller applied: 9 May. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 13 Sept. Lifted: 20 Sept.

Potatoes: Preparatory crop: Deep-tine cultivated: 18 Sept, 1972. Ploughed: 20 Dec. NPK applied: 26 Mar, 1973. Rotary cultivated, potatoes planted: 5 Apr. Weedkiller applied: 9 May. Grubbed: 1 June. Rotary ridged: 4 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July. Haulm mechanically destroyed: 23 Aug. Lifted: 26 Oct.

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Sugar beet: Magnesian limestone applied: 12 Oct, 1972. Ploughed: 12 Nov. PK and N applied: 20 Mar, 1973. Power harrowed, seed sown: 21 Mar. Weedkiller applied: 15 May. Singled: 24-25 May. Boron and insecticide applied: 25 June. Lifted: 9 Nov.

NOTE: Soil samples were taken in November and further samples were taken in April before treatment applied and after harvest for cyst and egg counts of Heterodera rostochiensis.

Standard errors per plot.

Potatoes, Total tubers: tonnes/hectare:	4.23 or 10.4% (51 d.f.)
Sugar beet, Roots (washed): tonnes/hectare:	3.70 or 8.5% (51 d.f.)
Total sugar: tonnes/hectare:	0.659 or 8.8% (51 d.f.)

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73/W/CS/35

TABLES OF MEANS

POTATOES

TOTAL TUBERS: TONNES/HECTARE

	NEMACIDE									
	None	Daz2	Daz3	Daz4	Daz6	Daz2/Te2	Te4	DuP	Te2/DuP	Mean
VARIETY										
Piper	25.5	41.2	45.7	46.2	48.0	42.0	42.0	37.3	46.0	41.6
Crown	23.0	45.1	44.5	42.6	48.6	41.5	39.0	36.6	40.1	40.1
Mean	24.2	43.2	45.1	44.4	48.3	41.7	40.5	36.9	43.1	40.8

STANDARD ERRORS OF DIFFERENCES

NEMACIDE	VARIETY* NEMACIDE
2.12	2.99

* Within the same level of VARIETY only

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73/W/CS/35

POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

	NEMACIDE								
VARIETY	None	Daz2	Daz3	Daz4	Daz6	Daz2/Te2	Te4	DuP	Te2/DuP	Mean
Piper	89.6	84.6	88.7	89.9	89.9	87.3	91.4	81.3	88.7	88.0
Crown	82.4	94.5	95.3	95.1	96.0	93.5	93.8	88.8	92.8	92.5
Mean	86.0	89.5	92.0	92.5	92.9	90.4	92.6	85.1	90.8	90.2

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https://doi.org/10.23637/ERADOC-1-98

73/W/CS/35

SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

	RESNEM									
	None	Daz2	Daz3	Daz4	Daz6	Daz2/Te2	Te4	DuP	Te2/DuP	Mean
RESVAR										
Piper	42.2	42.1	43.2	43.6	41.1	41.4	41.7	38.8	48.1	42.5
Crown	45.4	44.9	44.9	46.8	44.8	42.3	45.7	45.1	44.0	44.9
Mean	43.8	43.5	44.1	45.2	43.0	41.8	43.7	41.9	46.1	43.7

STANDARD ERRORS OF DIFFERENCES

RESNEM	RESVAR* RESNEM
1.85	2.62

* Within the same level of RESVAR only

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73/W/CS/35

SUGAR PERCENTAGE

	RESNEM None	Daz2	Daz3	Daz4	Daz6	Daz2/Te2	Te4	DuP	Te2/DuP	Mean
RESVAR										
Piper	16.9	17.3	17.1	17.0	16.9	16.9	16.6	17.2	17.2	17.0
Crown	17.4	16.8	17.3	17.0	17.1	17.2	17.3	17.3	17.0	17.1
Mean	17.2	17.1	17.2	17.0	17.0	17.0	16.9	17.2	17.1	17.1

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73/W/CS/35

TOTAL SUGAR: TONNES/HECTARE

	RESNEM None	Daz2	Daz3	Daz4	Daz6	Daz2/Te2	Te4	DuP	Te2/DuP	Mean
RESVAR										
Piper	7.15	7.31	7.39	7.45	6.93	6.97	6.90	6.68	8.30	7.23
Crown	7.89	7.54	7.74	7.97	7.65	7.28	7.89	7.78	7.47	7.69
Mean	7.52	7.43	7.57	7.71	7.29	7.13	7.40	7.23	7.88	7.46

STANDARD ERRORS OF DIFFERENCES

RESNEM	RESVAR* RESNEM
0.329	0.466

* Within the same level of RESVAR only

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73/R/CS/41

CULTIVATIONS AND SOIL INVERTEBRATES

Object: To study the effects of cultivations on yields of grass and on populations of soil animals - Road Piece.

Sponsor: C.A. Edwards.

The fifth year, old grass, new grass.

For previous years see 69/R/CS/41(t), 70/R/CS/41(t) and 71-72/R/CS/41.

Design: 4 blocks of 8 plots randomisation restricted.

Whole plot dimensions: 6.40 x 7.32. Area harvested: 0.00074.

Treatments: Cultivations and reseeding:	CULTIVTN
No treatments, to old grass (two plots per block)	O
Grass ploughed up:-	
In spring 1969, reseeded after fewest cultivations needed to produce a seedbed	SF
In spring 1969, reseeded after many seedbed cultivations	SM
In autumn 1969, reseeded spring 1970 after many seedbed cultivations	AM
Every spring since 1969, reseeded each year after fewest cultivations needed to produce a seedbed	SFR
Every spring since 1969, reseeded each year after many seedbed cultivations	SMR
Every autumn since 1969, reseeded every following spring after many seedbed cultivations	AMR

Seeds mixture for 1973: Parts by weight: New Zealand White Clover, 1; S 48 Timothy, 3; S 215 Meadow Fescue, 6. Mixture sown at 22 kg.

Basal applications: Manures: (0:14:28) at 500 kg in autumn, (25:0:16) at 440 kg in spring, (25:0:16) at 220 kg after each cut except the last.

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Cultivations, etc.:- Basal PK applied: 17 Nov, 1972. AMR plots ploughed: 11 Dec. SMR and SFR plots ploughed: 21 Feb, 1973. Basal NK fertiliser applied: 21 Feb. Disced AMR and SMR plots four times, SFR plots twice: 27 Mar. Power harrowed all plots to be sown: 28 Mar. Seed hand sown and harrowed in: 29 Mar. AMR, SMR and SFR plots sprayed with benazolin with 2, 4-DB and MCPA ('Legume Extra' 7.0 l in 220 l): 31 May. AMR, SMR and SFR plots cut twice: 4 July and 12 Sept, other plots cut three times: 22 May, 4 July and 12 Sept. NK applied to all plots except AMR, SMR and SFR: 25 May and to all plots: 4 July.

NOTE: Soil cores were taken for total fauna and quadrats were sampled on each plot for earthworms.

Standard errors per plot. Dry matter, tonnes/hectare:

1st cut:	0.457 or 11.8% (13 d.f.)
2nd cut:	0.551 or 28.4% (22 d.f.)
3rd cut:	0.332 or 10.7% (22 d.f.)
Total of 3 cuts:	0.534 or 6.4% (13 d.f.)

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73/R/CS/41

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

	CULTIVTN					CULTIVTN			
	O*	SF	SM	AM	Mean	SFR	SMR	AMR	Mean
1st cut	4.00	3.28	3.42	4.66	3.87				
2nd cut	1.80	1.98	2.33	1.95	1.97	1.96	1.93	1.74	1.94*
3rd cut	2.45	2.53	2.59	2.41	2.49	4.03	4.16	4.26	3.11*
Total of 3 cuts	8.24	7.79	8.34	9.03	8.33				

STANDARD ERRORS OF DIFFERENCES

	CULTIVTN	
	O v Any of remainder	Between remainder
1st cut	0.280	0.323
2nd cut	0.337	0.390
3rd cut	0.204	0.235
Total of 3 cuts	0.327	0.377

Mean D.M. %	1st cut	16.5
	2nd cut	23.5
	3rd cut	33.4
	Total of 3 cuts	24.5

* Grand mean

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73/R/CS/42

EFFECT OF INVERTEBRATES ON YIELD

Object: To study the effects of a range of invertebrate-killing chemicals on the yield of old grass - Road Piece.

Sponsor: I.F. Henderson.

The fifth year, old grass.

For previous years see 69/R/CS/42(t), 70/R/CS/42(t), 71/R/CS/42(t) and 72/R/CS/42(t).

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 2.74 x 6.40. Area harvested: 0.00065.

Treatments: Chemicals:

	CHEMICAL
None	0
To control foliar invertebrates:	
Chlorbenside spray until 1972, none since	(FCB)
Menazon spray, repeated frequently	FMZ
Chlorbenside (until 1972), menazon, dimethoate sprays and parathion/bran bait, repeated frequently	F3
To control soil invertebrates:	
Formalin, last applied in 1970	(SFO)
Parathion/bran bait, repeated frequently	SL
Nematicide C14421, last applied in 1970	(SN)
Metaldehyde, repeated frequently	SMT
Aldrin in 1969 and 1972 only, nematicide C14421 until 1970, metaldehyde repeated frequently	S3
As S3 + chlordane in 1969 and 1972	S4
To control foliar and soil invertebrates:	
As F3+S4 since 1969	F3S4
As F3+S4 since 1972 (previously untreated)	F3S4*

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Basal applications: Manures: (0:14:28) at 500 kg in winter, (25:0:16) at 440 kg in spring, (25:0:16) at 220 kg after each cut except the last.

Cultivations, etc.:- PK applied: 17 Nov, 1972. NK applied: 21 Feb, 1973. Cut three times: 22 May, 4 July, 12 Sept. NK applied after the first two cuts.

Chemical treatments applied:

Dimethoate:	11 May, 22 June, 23 July, 16 Aug.
Menazon:	10 May, 21 June, 20 July, 16 Aug.
Metaldehyde:	10 May, 21 June, 24 July, 15 Aug.
Parathion:	11 May, 21 June, 24 July, 25 Aug.

NOTE: Samples were taken for botanical analysis in May. Samples for fauna were taken after the last cut.

Standard errors per plot. Dry matter, tonnes/hectare:

1st cut:	0.505 or 11.3% (33 d.f.)
2nd cut:	0.305 or 15.6% (33 d.f.)
3rd cut:	0.234 or 11.6% (33 d.f.)
Total of 3 cuts:	0.586 or 6.9% (33 d.f.)

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73/R/CS/42

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
CHEMICAL				
0	3.91	1.96	2.26	8.13
(FCB)	3.75	2.14	2.12	8.01
FMZ	4.57	1.99	2.00	8.57
F3	4.95	1.80	1.66	8.40
(SFO)	4.20	1.73	2.41	8.34
SL	4.62	1.86	2.27	8.75
(SN)	4.16	1.97	2.24	8.37
SMT	4.08	2.14	1.87	8.10
S3	4.68	1.97	2.02	8.67
S4	4.58	2.07	1.99	8.63
F3S4	5.38	1.65	1.35	8.39
F3S4*	4.95	2.13	2.05	9.12
Mean	4.49	1.95	2.02	8.46
STANDARD ERRORS OF DIFFERENCES				
CHEMICAL	0.357	0.216	0.166	0.415

Mean D.M. % 1st cut: 16.8
2nd cut: 23.4
3rd cut: 36.2
Total of 3 cuts: 25.5

* Since 1972

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73/W/CS/49

RESISTANCE TO CYST NEMATODE

Object: To study the residual effects of formalin, applied at different times to winter and spring sown wheat 1970-72, on yields and the incidence of cereal cyst nematode on resistant and susceptible winter oats - Woburn Butt Close.

Sponsor: T.D. Williams.

The fourth year, winter oats.

For previous years see 70/W/CS/49(t), 71/W/CS/49(t) and 72/W/CS/49(t). (Until 1972 the title of the experiment was 'Fumigant and N'.)

Design: A single replicate of 4 blocks of 4 plots, split into 8.

Whole plot dimensions: 2.16 x 21.0. Sub plot area harvested: 0.00041.

Treatments: All combinations of:-

Whole plots:

1. Crops, sowing dates and times of applying formalin in the period 1970-1972: CROPETC
   - Winter wheat sown in autumn, formalin in early autumn — WWA
   - Winter wheat sown in spring, formalin in early autumn — WWS
   - Spring wheat sown in spring, formalin in early autumn — WSS
   - Spring wheat sown in spring, formalin in early spring — WSS*

Quarter plots (broadways):

2. Residues of nitrogen fertiliser (kg N) applied annually 1970-1972 in presence of basal dressing of 75 kg N in 1973: NRESID
   - 75 — 75
   - 125 — 125
   - 176 — 176
   - 226 — 226

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3. Formalin in 1970-1972: FORMALIN

1970	1971	1972	
None	None	None	000
None	Formalin	None	0F0
Formalin	None	Formalin	F0F
Formalin	Formalin	Formalin	FFF

Half plots (lengthways):

4. Varieties in 1973: VARIETY

Peniarth - susceptible to cereal cyst nematode SUSCEPT
Peniarth x Avena sterilis - resistant to cereal cyst nematode RESISTNT

Basal applications: Manures: 7.5 tonnes magnesian limestone, 340 kg (0:20:20) combine drilled, 300 kg 'Nitro-Chalk' in spring. Weedkiller: Ioxynil at 0.42 kg plus mecoprop at 1.30 kg in 290 l on first occasion, ioxynil at 0.63 kg plus mecoprop at 1.90 kg in 290 l on second occasion.

Seed: Both varieties sown at 180 kg.

Cultivations, etc.:- Deep-tine cultivated: 13 Sept, 1972. Magnesian limestone applied: 3 Oct. Seed sown: 26 Oct. N applied: 29 Mar, 1973. Weedkiller applied: 13 Apr, 26 Apr. Harvested by hand: 31 July.

NOTES: (1) Soil samples were taken before sowing and after harvest for counts of Heterodera avena eggs and larvae.
(2) Plant samples were tken in May for counts of root invasion by Heterodera avenae.

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.281 or 15.3% (8 d.f.)
Pooled quarter and half plot: 0.351 or 19.5% (72 d.f.)

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73/W/CS/49

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	NRESID				FORMALIN				VARIETY		
	75	125	176	226	000	0F0	F0F	FFF	SUSCEPT	RESISTNT	Mean
CROPETC											
WWA	2.20	2.37	2.20	1.98	2.28	2.35	2.26	1.86	2.14	2.24	2.19
WWS	1.65	2.01	1.63	1.74	1.73	1.70	1.85	1.74	1.77	1.74	1.76
WSS	1.72	2.07	1.97	1.41	1.78	1.83	1.87	1.69	1.81	1.78	1.79
WSS*	1.58	1.66	1.55	1.66	1.55	1.66	1.62	1.62	1.67	1.55	1.61
			NRESID								
			75		1.80	2.00	1.82	0.53	1.78	1.79	1.79
			125		2.19	1.90	1.99	2.02	2.03	2.02	2.03
			176		1.66	2.06	1.85	1.78	1.87	1.81	1.84
			226		1.69	1.59	1.94	1.57	1.71	1.68	1.70
							FORMALIN				
							000		1.85	1.82	1.84
							0F0		1.89	1.88	1.89
							F0F		1.92	1.89	1.90
							FFF		1.73	1.72	1.73
Mean									1.85	1.83	1.84

Mean D.M. % 80.8

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T3/H/CS/49

STANDARD ERRORS OF DIFFERENCES

CROPETC	NRESID	FORMALIN	VARIETY	CROPETC NRESID	CROPETC FORMALIN	CROPETC VARIETY
0.199	0.090	0.090	0.063	0.219	0.219	0.155
Except when comparing means with same level of CROPETC				0.180	0.180	0.127

NRESID FORMALIN	NRESID VARIETY	FORMALIN VARIETY
0.180	0.127	0.127

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73/W/CS/52

COPPER SPRAYS AND 'SCORCH'

Object: To study the residual effects of dazomet, formalin and aldicarb applied in 1971, repeated on half plots in 1972, at a range of nitrogen levels, on nematodes and yield of spring wheat. The effects of a copper oxychloride spray are also studied - Woburn Butt Close.

Sponsors: T.D. Williams, J. Bolton.

The third year, spring wheat.

For previous years see 71/W/CS/52(t) and 72/W/CS/52(t).

Design: 4 blocks of 12 plots, split into 2.

Whole plot dimensions: 2.13 x 9.14. Area harvested: 0.00059.

Treatments: All combinations of:-

Whole plots: 1. Fumigants:

	FUMIGANT
None	None
Aldicarb 9 kg	Aldicarb
Dazomet 380 kg	Dazomet
Formalin (38% formaldehyde) 3000 l	Formalin

2. Nitrogen fertiliser (kg N per annum) applied 1971 and 1972, with basal dressing of 165 kg N in 1973 only

	NRESID
63	63
126	126
189	189

3. Copper oxychloride foliar spray in 1973 (kg Cu)

	COPPER
0.0	0.0
1.1	1.1
2.2	2.2

Sub plots: 4. Years of application of fumigants:

	FUMYEAR
1971 only	1971
1971 and 1972 cumulatively	1971/72

On one block the test of copper oxychloride was omitted.

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73/W/CS/52

Basal applications: Manures: Magnesian limestone at 7.5 tonnes. N at 180 kg as 'Nitro-Chalk', (0:20:20) at 400 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 280 l.

Seed: Kleiber, sown at 190 kg.

Cultivations, etc.:- Deep-tine cultivated: 27 Sept, 1972. Magnesian limestone applied: 3 Oct. Deep-tine cultivated: 28 Oct. Ploughed: 4 Jan, 1973. N applied: 8 Mar. Seed sown: 15 Mar. Copper oxychloride treatments applied: 31 May. Weedkiller applied: 11 May. Combine harvested: 20 Aug.

NOTE: 1. Soil samples were taken before sowing and after harvest for counts of nematode eggs and larvae.
2. Plant samples were taken in May for counts of root invasion by nematodes.

Standard errors per plot.
Grain, tonnes/hectare: Blocks 2, 3 and 4: Whole plot: 0.345 or 18.3% (10 d.f.)
Sub plot: 0.216 or 11.5% (28 d.f.)

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73/W/CS/52

TABLES OF MEANS

GRAIN: TONNES/HECTARE

BLOCKS 2, 3 AND 4

	NRESID			COPPER			FUMYEAR		
	63	126	189	0.0	1.1	2.2	1971	1971/72	Mean
FUMIGANT									
None	1.69	1.78	1.53	1.64	1.83	1.53	1.67	1.67	1.67
Aldicarb	2.02	2.10	1.92	2.23	1.89	1.92	1.95	2.08	2.01
Dazomet	2.12	1.90	2.03	2.13	1.78	2.12	1.94	2.08	2.01
Formalin	1.71	1.81	2.00	1.74	1.79	2.00	1.86	1.83	1.84
		NRESID							
		63		1.88	1.82	1.95	1.87	1.90	1.88
		126		1.87	1.89	1.93	1.88	1.92	1.90
		189		2.05	1.76	1.79	1.81	1.92	1.87
					COPPER				
					0.0		1.89	1.99	1.94
					1.1		1.75	1.89	1.82
					2.2		1.92	1.86	1.89
Mean							1.85	1.91	1.88

STANDARD ERRORS OF DIFFERENCES

FUMIGANT	NRESID	COPPER	FUMYEAR	FUMIGANT NRESID	FUMIGANT COPPER	NRESID COPPER	FUMIGANT FUMYEAR
0.163	0.141	0.141	0.051	0.282	0.282	0.247	0.178

Except when comparing means with same level of FUMIGANT 0.102

NRESID FUMYEAR	COPPER FUMYEAR
0.154	0.154

Except when comparing means with same level of
NRESID 0.088
COPPER 0.088

Mean D.M. % 85.8

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73/W/CS/52

GRAIN: TONNES/HECTARE

BLOCK 1

	NRESID 63	126	189	FUMYEAR 1971	1971/72	Mean
FUMIGANT						
None	1.85	2.01	2.05	1.93	2.00	1.97
Aldicarb	2.54	2.30	1.45	2.24	1.96	2.10
Dazomet	2.04	2.28	2.00	2.02	2.19	2.11
Formalin	1.66	1.84	2.22	2.00	1.81	1.91
NRESID						
63				2.11	1.94	2.02
126				2.07	2.14	2.11
189				1.97	1.89	1.93
Mean				2.05	1.99	2.02

NRESID	63		126		189	
FUMYEAR	1971	1971/72	1971	1971/72	1971	1971/72
FUMIGANT						
None	1.76	1.94	2.02	1.99	2.02	2.08
Aldicarb	2.73	2.36	2.41	2.18	1.57	1.33
Dazomet	1.97	2.10	2.15	2.42	1.96	2.04
Formalin	1.96	1.35	1.71	1.97	2.33	2.11

Mean D.M. % 85.8

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73/W/CS/55

FUMIGATION AND N

Object: To study cumulative effects of dazomet and nitrogen fertiliser on pathogens and yield of spring beans grown continuously - Woburn Butt Furlong.

Sponsors: J. McEwen, G.A. Salt, D. Hornby.

The fifth year, spring beans.

For previous years see 69/W/BE/1(t) and 70-72/W/CS/55.

Design: 3 blocks of 6 plots.

Whole plot dimensions: 2.13 x 4.27. Area harvested: 0.00020.

Treatments: All combinations of:-

1. Dazomet (kg per annum) cumulative 1969-73:

	DAZOMET
None	0
450	450

2. Nitrogen fertiliser (kg N per annum) cumulative 1969-73:

	N
None	0
126	126
252	252

Basal applications: Manures: (0:14:28) at 370 kg, placement drilled.
Insecticide: Demeton-s-methyl at 0.25 kg in 290 l.

Seed: Minor, sown at 190 kg.

Cultivations, etc.:- Ploughed: 10 Oct, 1972. Dazomet applied, all plots rotary cultivated twice: 12 Oct. Rolled: 13 Oct. Ploughed second time: 27 Dec. Seed sown: 27 Feb, 1973. First half N applied: 13 Mar. Second half N applied: 15 May. Insecticide applied: 26 June. Hand harvested: 6 Sept.

NOTES: (1) Soil samples were taken for counts of ectoparasitic nematodes.
(2) Plant samples were taken for observation of fungal pathogens.
(3) Counts were made of number of stems and pods before harvest.
(4) 1000 grain weights and % nitrogen in grain were determined.

Standard error per plot.
Grain, tonnes/hectare: 0.371 or 12.8% (10 d.f.)

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73/W/CS/55

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N			
	0	126	252	Mean
DAZOMET				
0	2.62	2.29	2.81	2.57
450	2.94	3.43	3.32	3.23
Mean	2.78	2.86	3.07	2.90

STANDARD ERRORS OF DIFFERENCES

DAZOMET	N	DAZOMET N
0.175	0.214	0.303

Mean D.M. % 87.4

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73/W/CS/66

DAZOMET AND NITROGEN

Object: To study the cumulative effects of dazomet and nitrogen on pathogens and yield of maize grown continuously - Woburn Butt Furlong.

Sponsors: A.J. Barnard, D. Hornby.

The third year, maize.

For previous years see 71/W/CS/66(t) and 72/W/CS/66(t).

Design: 4 blocks of 2 plots split into 4.

Whole plot dimensions: 2.13 x 16.5. Area harvested: 0.00053.

Treatments: All combinations of:-

Whole plots: 1. Dazomet (kg per annum) cumulative 1971-73:

	DAZOMET
0	0
450	450

Sub plots: 2. Nitrogen fertiliser (kg N per annum) cumulative 1971-73:

	N
50 to seedbed	50
100 to seedbed	100
150 to seedbed	150
100 to seedbed, 50, five weeks after germination	100+50

Basal applications: Manures: (0:14:28) at 870 kg. Weedkiller: Atrazine at 1.1 kg in 280 l.

Seed: Pioneer 131, sown at 30 kg.

Cultivations, etc.:- Deep-tine cultivated: 11 Aug, 1972. Dazomet applied, all plots rotary cultivated twice: 12 Oct. Rolled: 13 Oct. Ploughed: 3 Jan, 1973. PK applied, weedkiller applied and harrowed in: 27 Apr. N applied, seed sown: 2 May. Late N applied: 2 July. Harvested by hand: 1 Nov.

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NOTES: (1) Soil samples were taken in spring before sowing and again after harvest for counts of ectoparasitic nematodes.
(2) Leaf samples were taken in September for analysis of % P and K.
(3) Plant samples were taken in September for incidence of stem and leaf pathogens.
(4) % N in grain was determined.
(5) Two plots, DAZOMET 450, N 150 and N 50, were waterlogged and one DAZOMET 0, N 100+50 was damaged by birds. Estimated values were used in the analysis.

Standard error per sub plot.
Grain, tonnes/hectare: 0.835 or 14.5% (15 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N				
	50	100	150	100+50	Mean
DAZOMET					
0	5.33	4.55	5.66	6.08	5.41
450	5.88	6.46	6.05	5.92	6.08
Mean	5.60	5.51	5.85	6.00	5.74

STANDARD ERRORS OF DIFFERENCES

N	DAZOMET* N
0.417	0.590

* Within the same level of DAZOMET only

Mean D.M. % 64.7

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73/R/CS/74

BREAK CROPS AND WHEAT

Object: To study the effects of different break crops on yields and soil-borne pathogens of a following sequence of cereals - Fosters West.

Sponsors: G.V. Dyke, R.D. Prew.

The third year, spring barley.

For previous years see 71/R/CS/74(t) and 72/R/CS/74(t).

Design: 3 randomised blocks of 10 plots, split into 4.

Whole plot dimensions: 4.27 x 39.3. Sub plot area harvested: 0.00260.

Treatments: All combinations of:-

Whole plots: 1. Crops and nitrogen 1971:-

	CROP 71
Barley given 50 kg N	B1
Barley given 50 kg N, undersown trefoil	B1T
Oats given 50 kg N	O1
Oats given 50 kg N, undersown trefoil	O1T
Maize given 100 kg N	MA2
Maize given 200 kg N	MA4
Spring beans (2 plots per block)	BE
Clover (2 plots per block)	CL

Sub plots: 2. Nitrogen fertiliser (cumulative to wheat 1972) kg N:-

	N
None	0
50	50
100	100
150	150

Basal applications: Manures: 310 kg (0:20:20) combine drilled.
Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Seed: Julia, dressed with ethirimol, sown at 160 kg.

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Cultivations, etc.:- Ploughed: 8 Nov, 1972. Rotary cultivated: 14 Mar, 1973. Seed sown: 15 Mar. N applied: 24 Mar. Weedkiller applied: 15 May. Combine harvested: 9 Aug.

NOTE: Samples were taken in August for estimation of take-all (Gaeumannomyces graminis).

Standard errors per plot, grain: tonnes/hectare.
Whole plot: 0.125 or 2.3% (20 d.f.)
Sub plot: 0.303 or 5.5% (66 d.f.)

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73/R/CS/74

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CROP 71

	B1	B1T	O1	O1T	MA2	MA4	BE	CL	Mean
N									
0	3.81	4.06	3.80	3.88	3.46	3.97	4.05	4.18	3.94
50	5.84	6.06	5.60	5.99	6.05	6.10	5.87	6.13	5.96
100	5.83	6.19	6.15	5.74	5.78	5.95	6.06	5.74	5.92
150	5.91	6.13	6.22	6.06	6.26	5.86	5.93	5.87	6.01
Mean	5.35	5.61	5.44	5.42	5.39	5.47	5.48	5.48	5.46

STANDARD ERRORS OF DIFFERENCES

CROP 71

Excluding BE and CL	0.102
BE v CL	0.072
BE or CL v Remainder	0.089
N	0.078

CROP 71
N

Excluding BE and CL	0.237
BE and CL	0.168
BE or CL v Remainder	0.206

Except when comparing means with same level of CROP 71

Excluding BE and CL	0.247
BE and CL	0.175

Mean D.M. % 81.2

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73/W/CS/78

NEMATODES AND VERTICILLIUM

Object: To study the residual effects of methyl bromide, aldicarb, dazomet and benomyl (applied to potatoes in 1971) on Heterodera rostochiensis and Verticillium on a third potato crop in 1973 - Woburn Broadmead I.

Sponsors: D.C.M. Corbett, G.A. Hide.

The third year, potatoes.

For previous years see 71/W/CS/78(t) and 72/W/CS/78(t).

Design: 4 blocks of 6 plots.

Whole plot dimensions: 2.84 x 12.8. Area harvested: 0.00147.

Treatments: Residues of chemicals applied in 1971 (kg):-

	CHEMICAL
None	None
Aldicarb, 6.7	Aldicarb
Benomyl, 22.4	Benomyl
Aldicarb, 6.7 + benomyl, 22.4	Ald/Ben
Dazomet, 336	Dazomet
Methyl bromide, 975	Methylbr

Basal applications: Manures: (13:13:20) at 1510 kg. Weedkiller: Linuron at 1.7 kg plus paraquat at 0.42 kg ion in 280 l. Paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg, in 390 l on the first occasion and in 370 l on the second occasion.

Variety: Pentland Dell.

Cultivations, etc.:- Deep-tine cultivated three times: 15 Sept, 1972, 20 Sept, 19 Dec. NPK applied: 27 Mar, 1973. Deep-tine cultivated: 5 Apr. Rotary cultivated, potatoes planted: 11 Apr. Linuron and paraquat applied: 14 May. Paraquat applied: 21 May. Grubbed: 6 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 23 Aug. Lifted: 10 Sept.

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NOTE: (1) Verticillium leaf symptoms were scored on July 4, 11, 17, 24 and 31.

(2) Soil samples were taken before planting and after harvest for counts of numbers of cysts, eggs and larvae of Heterodera rostochiensis and propagules of Verticillium.

(3) The yields on the plots not given benomyl were very small because of soil-borne pathogens, and were therefore analysed separately from the others.
The S.E. per plot for the latter was estimated from only 3 d.f. The normal practice in 'Yields' is to omit S.E.s estimated from 3 or less d.f., but in view of the special circumstances the S.E.s for the plots given benomyl have been shown. The S.E.s for the plots not given benomyl have not been shown.

Standard error per plot. Total tubers, tonnes/hectare:
Plots given benomyl: 2.67 or 18.2% (3 d.f.)

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73/W/CS/78

TABLES OF MEANS

Plots not given benomyl

CHEMICAL

None	Aldicarb	Dazomet	Methylbr	Mean
TOTAL TUBERS: TONNES/HECTARE				
2.2	3.3	1.8	1.2	2.1
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
43.9	40.4	36.6	28.1	37.3

Plots given benomyl

CHEMICAL

Benomyl	Ald/Ben	Mean
TOTAL TUBERS: TONNES/HECTARE		
12.7	16.7	14.7

STANDARD ERRORS OF DIFFERENCES

CHEMICAL

1.87

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE		
77.5	82.8	80.1

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73/R/CS/82

CHEMICAL CONTROL OF SOIL-BORNE PATHOGENS

Object: To study the effects of a range of chemicals on pathogens and yield of beans grown continuously for seven years - Barnfield Section I Plot 3.

Sponsors: D. Hornby, G.A. Salt.

The third year, spring beans.

For previous years see 71/R/BE/1(t) and 72/R/CS/82(t).

Design: 4 blocks of 6 plots.

Whole plot dimensions: 3.73 x 2.29. Area harvested: 0.00039.

Treatments (applied cumulatively to treatments in 1971 and 1972):

	CHEMICAL
None	None
Dexon, fungicide, at 78.5 kg. Powder	Dexon
BHC, insecticide, at 4.48 kg. Emulsion in 68000 l	BHC
Aldicarb, nematicide, at 11.2 kg. Granules	Aldicarb
Formalin, biocide, at 3000 l of a 38% solution of formaldehyde in 64000 l	Formalin
Dexon, aldicarb and formalin together at the above rates	Dx/Al/Fo

NOTE: Treatment Dx/Al/Fo received only aldicarb and formalin treatments in 1971.

Basal applications: Manures: PKNaMg rates as on Barnfield. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- Ploughed: 8 Nov, 1972. Formalin applied: 8 Dec. Remaining chemicals applied and all plots rotary cultivated 12 Mar, 1973. Seed sown: 13 Mar. Weedkiller applied: 16 Mar. Insecticide applied: 8 June. Harvested by hand: 29 Aug.

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NOTE: Development of wilt was recorded during July and August. Crop samples were taken for root disease assessment. Counts were made of stem eelworm. Numbers of pods, fertile nodes per plant and crop height were recorded.

Standard error per plot.
Grain, tonnes/hectare: 0.491 or 13.6% (15 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CHEMICAL

None	Dexon	BHC	Aldicarb	Formalin	Dx/Al/Fo	Mean
2.71	3.80	3.22	3.83	4.00	4.16	3.62

STANDARD ERROR OF DIFFERENCES

CHEMICAL

0.347

Mean D.M. % 86.9

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73/R/CS/86

WEEDKILLER AND AQUEOUS N

Object: To study the effects of a range of rates of solid or liquid nitrogen fertilizer in combination with a range of rates of hormone weedkiller, on weed control and yield of old grass - Ver.

Sponsors: S.C.R. Freeman, A. Penny.

The second year, old grass.

For previous year see 72/R/CS/86(t).

Design: 3 randomised blocks of 28 plots.

Whole plot dimensions: 2.74 x 1.37. Area harvested: 0.00002.

Treatments (applied per cut): All combinations of:-

1. Form of nitrogen:	FORM
Solid, as 'Nitro-Chalk' 21% N	Solid
Liquid, as urea/ammonium nitrate 26% N, alone or mixed with the weedkiller (using fan jet size 00)	Liquid
2. Rate of nitrogen (kg N):	NPERCUT
37.7	37.7
75.3	75.3
113.0	113.0
3. Weedkiller (dichloprop/MCPA, kg total a.e.) (using fan jet size 00)	WEEDKLLR(00)
None	0.0
1.4	1.4
2.8	2.8
4.2	4.2
together with four treatments all given liquid fertiliser, urea/ammonium nitrate, at 113 kg N per cut, using fan jet size 1. Weedkiller (dichloprop/MCPA, kg total a.e.) - EXTRA:	WEEDKLLR(1)
None	0.0
1.4	1.4
2.8	2.8
4.2	4.2

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NOTE: The weedkiller was applied in 337 l where solid fertiliser was used. The liquid fertiliser (with or without weedkiller) was applied as a spray at 112, 225 and 337 l for the three rates tested.

Basal applications: Manures: (0:14:28) at 630 kg.

Cultivations, etc.:- Basal PK broadcast: 8 Dec, 1972. Treatments applied: 10 Apr, 1973 repeated 2 July. Grass cut: 6 June, 3 Sept.

NOTE: (1) Scores were made of foliar scorch after first and second treatments.
(2) The yield of weeds at the second cut was measured.
(3) The % N in the herbage was measured.

Standard errors per plot. Dry matter, tonnes/hectare:
1st cut: 0.600 or 10.0% (54 d.f.)
2nd cut: 0.478 or 11.3% (54 d.f.)
Total of 2 cuts: 0.872 or 8.5% (54 d.f.)

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73/R/CS/86

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

	NPERCUT			WEEDKLLR(00)				
	37.7	75.3	113.0	0.0	1.4	2.8	4.2	Mean
FORM								
Solid	5.49	6.62	6.84	6.42	6.52	6.30	6.03	6.32
Liquid	4.77	5.82	6.27	5.43	5.53	5.75	5.77	5.62

NPERCUT				
37.7	5.27	5.03	5.11	5.11	5.13
75.3	6.20	6.40	6.36	5.92	6.22
113.0	6.31	6.64	6.61	6.68	6.56
Mean	5.93	6.02	6.02	5.90	5.97

WEEDKLLR(00)

FORM	NPERCUT	0.0	1.4	2.8	4.2
Solid	37.7	5.91	5.51	5.50	5.03
	75.3	6.75	6.81	6.76	6.17
	113.0	6.62	7.22	6.63	6.90
Liquid	37.7	4.63	4.54	4.72	5.19
	75.3	5.66	5.99	5.95	5.66
	113.0	6.00	6.06	6.58	6.46

EXTRA

WEEDKLLR(1)

0.0	1.4	2.8	4.2	Mean
6.76	6.01	6.05	6.83	6.41

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73/R/CS/86

DRY MATTER: TONNES/HECTARE

2ND CUT

	NPERCUT			WEEDKLLR(00)				
	37.7	75.3	113.0	0.0	1.4	2.8	4.2	Mean
FORM								
Solid	4.16	4.33	4.21	4.24	4.39	4.34	3.96	4.24
Liquid	3.82	4.43	4.27	4.25	4.20	4.03	4.22	4.18
NPERCUT								
37.7				3.91	3.95	4.15	3.96	3.99
75.3				4.57	4.54	4.34	4.08	4.38
113.0				4.26	4.40	4.07	4.25	4.24
Mean				4.24	4.30	4.19	4.09	4.21

WEEDKLLR(00)

FORM	NPERCUT	0.0	1.4	2.8	4.2
Solid	37.7	4.02	4.33	4.44	3.85
	75.3	4.66	4.46	4.38	3.83
	113.0	4.05	4.38	4.21	4.21
Liquid	37.7	3.79	3.56	3.86	4.07
	75.3	4.48	4.62	4.31	4.32
	113.0	4.46	4.42	3.92	4.28

EXTRA

WEEDKLLR(1)

0.0	1.4	2.8	4.2	Mean
4.26	4.44	4.18	4.41	4.32

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73/R/CS/86

DRY MATTER: TONNES/HECTARE

TOTAL OF 2 CUTS

	NPERCUT			WEEDKILL(00)				
	37.7	75.3	113.0	0.0	1.4	2.8	4.2	Mean
FORM								
Solid	9.65	10.95	11.05	10.67	10.91	10.64	10.00	10.55
Liquid	8.59	10.25	10.55	9.68	9.73	9.78	9.99	9.80

NPERCUT					
37.7	9.18	8.98	9.26	9.07	9.12
75.3	10.77	10.94	10.70	9.99	10.60
113.0	10.57	11.04	10.68	10.92	10.80
Mean	10.17	10.32	10.21	9.99	10.17

WEEDKILL(00)

FORM	NPERCUT	0.0	1.4	2.8	4.2
Solid	37.7	9.93	9.85	9.94	8.88
	75.3	11.41	11.27	11.13	10.00
	113.0	10.67	11.60	10.85	11.11
Liquid	37.7	8.43	8.11	8.58	9.26
	75.3	10.14	10.61	10.27	9.98
	113.0	10.47	10.48	10.51	10.74

EXTRA

WEEDKILL(1)

0.0	1.4	2.8	4.2	Mean
11.02	10.45	10.23	11.23	10.73

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STANDARD ERRORS OF DIFFERENCES

FORM	NPERCUT	WEEDKLLR	EXTRA	FORM NPERCUT	FORM WEEDKLLR
		1ST CUT			
0.142	0.173	0.200	0.490	0.245	0.283
NPERCUT WEEDKLLR	FORM NPERCUT WEEDKLLR				
0.347	0.490				
Grand mean	6.03				
Mean D.M. %	20.6				
		2ND CUT			
0.113	0.138	0.159	0.390	0.195	0.225
0.276	0.390				
Grand mean	4.22				
Mean D.M. %	29.6				
		TOTAL OF 2 CUTS			
0.206	0.252	0.291	0.712	0.356	0.411
0.503	0.712				
Grand mean	10.25				
Mean D.M. %	25.1				

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73/R/CS/88 and 73/W/CS/88

FERTILISER AND FYM

Object: To study the residual effects of a range of rates of NPK fertiliser and FYM applied to potatoes on the yield of winter wheat - Rothamsted, Great Knott I (R) and Woburn, Warren Field I (W).

Sponsor: F.V. Widdowson.

The second year, winter wheat.

For previous year see 72/RW/CS/88(t).

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 16.2. Area harvested: 0.00217.

Treatments: All combinations of:-

Whole plots: 1. Farmyard manure to potatoes in 1972 (tonnes): FYM

(R)	(W)	(R)	(W)
None	None	0	0
53	73	53	73

2. N and PK fertilisers to potatoes in 1972 to give rates of nitrogen* (kg N): NRESID

188	188
377	377
565	565

3. Times of applying PK fertilisers to potatoes: TIME

All in autumn 1971	Autumn
All in spring 1972	Spring
Half in autumn, half in spring	Aut/Spng

Sub plots: 4. Nitrogen fertiliser to wheat in 1973 (kg N): N

None	0
63	63

* the ratio of N:P2O5:K2O was 1:1.5:1.5 for all NRESID treatments.

Basal applications:

Great Knott I (R): Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7 l in 220 l).

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Warren Field I (W): Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l.

Seed: Great Knott I (R): Cappelle, sown at 200 kg.
Warren Field I (W): Cappelle, sown at 190 kg.

Cultivations, etc.:-
Great Knott I (R): Deep-tine cultivated twice: 23 Oct, 1972. Power harrowed: 25 Oct. Seed sown: 26 Oct. N applied: 13 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 22 Aug.
Warren Field I (W): Deep-tine cultivated: 19 Oct, 1972. Seed sown 24 Oct. N applied: 19 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 22 Aug.

Standard errors per plot. Grain, tonnes/hectare.

Great Knott I (R):	Whole plot:	0.429 or 7.0%	(34 d.f.)
	Sub plot:	0.688 or 11.2%	(36 d.f.)
Warren Field I (W):	Whole plot:	0.385 or 8.1%	(34 d.f.)
	Sub plot:	0.471 or 9.9%	(36 d.f.)

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73/R/CS/88 and 73/W/CS/88

TABLES OF MEANS

GREAT KNOTT I (R)

GRAIN: TONNES/HECTARE

	NRESID			TIME			N		
	188	377	565	Autumn	Spring	Aut/Spng	0	63	Mean
FYM									
0	7.26	5.95	5.62	6.16	6.12	6.55	6.44	6.11	6.27
53	6.69	5.59	5.66	5.79	6.07	6.07	6.17	5.78	5.98
			NRESID						
			188	6.89	6.82	7.21	7.21	6.74	6.97
			377	5.53	5.84	5.93	5.96	5.58	5.77
			565	5.50	5.62	5.79	5.75	5.52	5.64
						TIME			
						Autumn	6.13	5.82	5.97
						Spring	6.35	5.84	6.09
						Aut/Spng	6.44	6.18	6.31
Mean							6.31	5.95	6.13

STANDARD ERRORS OF DIFFERENCES

FYM	NRESID	TIME	N	FYM NRESID	FYM TIME	NRESID TIME	FYM N	NRESID N	TIME N
0.117	0.143	0.143	0.132	0.202	0.202	0.248	0.177	0.216	0.216

Except when comparing means with same level of

FYM		0.187	
NRESID			0.229
TIME			0.229

Mean D.M. % 83.6

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73/R/CS/88 and 73/W/CS/88

GREAT KNOTT I (R)

STRAW: TONNES/HECTARE

	NRESID			TIME			N		
	188	377	565	Autumn	Spring	Aut/Spng	0	63	Mean
FYM									
0	7.11	9.28	9.22	8.56	8.36	8.69	8.34	8.73	8.54
53	8.73	9.38	9.39	9.30	9.01	9.18	9.07	9.26	9.16
			NRESID						
			188	8.18	7.45	8.11	7.35	8.48	7.92
			377	9.21	9.28	9.51	9.28	9.38	9.33
			565	9.40	9.32	9.19	9.49	9.12	9.30
						TIME			
						Autumn	8.74	9.12	8.93
						Spring	8.56	8.81	8.69
						Aut/Spng	8.82	9.05	8.93
Mean							8.71	8.99	8.85

Mean D.M. % 84.0

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73/R/CS/88 and 73/W/CS/88

WARREN FIELD I (W)

GRAIN: TONNES/HECTARE

	NRESID			TIME			N		
	188	377	565	Autumn	Spring	Aut/Spng	0	63	Mean
FYM									
0	5.35	5.25	3.71	4.75	5.00	4.55	4.84	4.70	4.77
73	5.68	4.84	3.87	4.56	4.82	5.01	5.02	4.57	4.80
			NRESID						
			188	5.66	5.43	5.46	4.94	6.09	5.52
			377	4.60	5.40	5.13	5.58	4.50	5.04
			565	3.71	3.92	3.74	4.26	3.32	3.79
						TIME			
						Autumn	4.83	4.48	4.66
						Spring	5.03	4.80	4.91
						Aut/Spng	4.92	4.64	4.78
Mean							4.93	4.64	4.78

STANDARD ERRORS OF DIFFERENCES

FYM	NRESID	TIME	N	FYM NRESID	FYM TIME	NRESID TIME	FYM N	NRESID N	TIME N
0.105	0.128	0.128	0.091	0.182	0.182	0.222	0.139	0.170	0.170
Except when comparing means with same level of									
FYM							0.128		
NRESID								0.157	
TIME									0.157

Mean D.M. % 83.2

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73/R/CS/88 and 73/W/CS/88

WARREN FIELD I (W)

STRAW: TONNES/HECTARE

	HRESID			TIME			N		
	188	377	565	Autumn	Spring	Aut/Spng	0	63	Mean
FYM									
0	5.88	6.71	6.69	6.35	6.62	6.31	6.12	6.73	6.43
73	6.09	6.93	6.48	6.54	6.43	6.54	6.57	6.43	6.50
			HRESID						
			188	6.38	5.76	5.81	5.04	6.93	5.98
			377	6.54	6.74	7.18	7.05	6.59	6.82
			565	6.41	7.08	6.28	6.95	6.22	6.59
						TIME			
						Autumn	6.25	6.64	6.44
						Spring	6.38	6.67	6.52
						Aut/Spng	6.41	6.44	6.42
Mean							6.35	6.58	6.46

Mean D.M. % 88.4

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73/W/CS/89

DAZOMET AND ORGANIC MATTER

Object: To study the residual effects and interactions of organic matter, inorganic fertilisers and the cumulative effects of dazomet on yield of potatoes and incidence of Heterodera rostochiensis - Woburn Long Mead.

Sponsor: A.G. Whitehead.

The second year, potatoes.

For previous year see 72/W/CS/89(t).

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.84 x 6.10. Area harvested: 0.00087.

Treatments: All combinations of:-

1. Organic manures and fertilisers applied in 1972 (in presence of 1510 kg (13:13:20) in 1973)	MANURE
None	None
Farmyard manure, 63.3 tonnes	FYM
Peat, 36.2 tonnes (12.6 tonnes D.M.) + PK equivalent to that in farmyard manure (172 kg P_2O_5, 433 kg K_2O)	Peat+PK
Fertiliser, PK equivalent to that in farmyard manure	PK
2. Dazomet (applied cumulatively 1972 and 1973) kg	DAZOMET
0	0
336	336

Basal applications: Manures: (13:13:20) at 1510 kg. Weedkiller: Linuron at 1.7 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

Variety: Pentland Crown.

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Cultivations, etc.:- Ploughed: 8 Nov, 1972. Dazomet applied, all plots rotary cultivated: 28 Feb, 1973. Basal NPK applied: 28 Mar. Rotary cultivated, potatoes planted: 5 Apr. Weedkiller applied: 9 May. Grubbed: 1 June. Fungicide with insecticide applied: 4 July. Fungicide applied: 25 July, 13 Aug. Haulm mechanically destroyed: 21 Aug. Lifted: 5 Sept.

NOTES: 1. Soil samples were taken in autumn 1972 and after harvest 1973 for cyst and egg counts of Heterodera rostochiensis.
2. The yields of the DAZOMET 0 plots were extremely poor because of severe infestation by potato cyst nematodes and weeds. Separate analyses were made for DAZOMET 0 and DAZOMET 336 plots and standard errors are presented for the latter only.

Standard error per plot. DAZOMET 336 only:
Ware tubers, over 3.81 cm (1.5 inch)riddle: tonnes/hectare:
3.20 or 10.2 % (6 d.f.)

TABLES OF MEANS

WARE TUBERS OVER 3.81 CM (1.5 INCH) RIDDLE: TONNES/HECTARE

MANURE

	None	FYM	Peat+PK	PK	Mean
DAZOMET					
0	0.3	0.3	0.2	0.4	0.3
336	35.7	29.5	31.7	28.1	31.3

STANDARD ERROR OF DIFFERENCES DAZOMET 336 only

MANURE

2.61

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73/R/CS/90

CULTIVATIONS FOR CEREALS

Object: To study the engineering aspects - power requirements, rate of work, revenue and costs - of different tillage systems for wheat. Effects on weeds, soil pathogens and yields are also studied - Meadow.

Sponsors: D.E. Patterson (N.I.A.E.), R. Moffitt.

The second year, winter wheat.

For previous year, see 72/R/CS/90(t).

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 13.7 x 33.8. Area harvested: 0.01031.

Treatments: Tillage systems:-	TILLAGE
Three passages of the tractor (three-pass system): Ploughed* 20 cm deep (8 inches): spring-tine cultivated: drilled	1
Four-pass system: Tine cultivated* 15 cm deep (6 inches) twice: spring-tine cultivated: drilled	2
Two-pass system: Ploughed* 20 cm deep (8 inches): spring-tine cultivated and drilled	3
Two-pass system: Ploughed* 10 cm deep (4 inches): spring-tine cultivated and drilled	4
Two-pass system: Tine cultivated* 20 cm deep (8 inches): spiked rotary cultivated and drilled	5
Two-pass system: Tine cultivated* 10 cm deep (4 inches): spiked rotary cultivated and drilled	6
Two-pass system: Sprayed with paraquat** (0.56 kg ion): tine cultivated 10 cm deep (4 inches), rotary cultivated and drilled	7
Three-pass system: Sprayed with paraquat** (0.56 kg ion): rotary digger cultivated: rotary harrowed and drilled	8
Two-pass system: Ploughed* 20 cm deep (8 inches): rotary harrowed and drilled	9
Two-pass system: Rotary digger cultivated: spring-tine cultivated and drilled	10

NOTE: Rotary digger - depth of working: rotor 10 cm (4 inches), tines 20 cm (8 inches)

* Cultivations done on 14 Sept, 1972.

** Paraquat applied in 220 l 5 Oct.

All other cultivations and all drilling done on 13 Oct with a disc drill.

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Basal applications: Manures: (10:24:24) at 310 kg combine drilled, 'Nitro-Chalk' at 410 kg. Weedkiller: Mecoprop ('Compitox Plus' at 4.2 l in 220 l).

Seed: Cappelle, sown at 190 kg.

Cultivations, etc.:- N applied: 13 Apr, 1973. Weedkiller applied: 16 Apr. Combine harvested: 23 Aug.

NOTES: Observations and determinations were made as follows:
(1) Soil: Mechanical analysis and profile descriptions, moisture determinations, bulk densities, photographs.
(2) Implements: Depth and width of work, forward speed, wheel slip, draught, p.t.o. power, labour requirements.
(3) Crop: Plant and tiller counts, incidence of eyespot (Cercosporella herpotrichoides) and take-all (Gaeumannomyces graminis), weed assessments, grain size, aerial photographs.

Standard error per plot.
Grain, tonnes/hectare: 0.358 or 6.6% (18 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

TILLAGE

1	2	3	4	5	6	7	8	9	10	Mean
5.39	5.73	5.27	5.14	5.48	5.68	5.73	5.14	5.21	5.48	5.43

STANDARD ERROR OF DIFFERENCES

TILLAGE

0.293

Mean D.M. % 85.3

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73/R/CS/93 and 73/W/CS/93

RATES OF NPK FERTILISER

Object: To study the residual effects of a range of rates of compound NPK fertiliser applied to potatoes on the yield of winter wheat - Rothamsted (R) Delafield and Woburn (W) Great Hill III.

Sponsor: F.V. Widdowson.

The second year, winter wheat.

For previous year see 72/R&W/CS/93(t).

Design: 4 blocks of 8 plots, split into 2.

Whole plot dimensions: Delafield (R): 4.27 x 16.1. Great Hill III (W): 4.27 x 21.0. Area harvested: Delafield (R): 0.00217. Great Hill III (W): 0.00286.

Treatments: All combinations of:-

Whole plots: 1. Compound fertiliser (13:13:20) to potatoes in 1972 (kg): FERT 72

1260	1260
1880	1880
2510	2510
3140	3140

2. Spacing of potatoes within the row in 1972 (cm): SPACING

30	30
45	45

Sub plots: 3. Variety of potatoes in 1972: VARIETY

Delafield (R)	Great Hill III (W)		
King Edward	Pentland Crown	Edward	Crown
Pentland Crown	Record	Crown	Record

4. Nitrogen fertiliser to wheat in 1973 (kg N): N 73

Delafield (R)	Great Hill III (W)		
37.5	63	37.5	63
75.0	126	75.0	126

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Basal applications:
Delafield (R): Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l).
Great Hill III (W): Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l.

Seed: Delafield (R): Cappelle, sown at 200 kg.
Great Hill III (W): Cappelle, sown at 190 kg.

Cultivations, etc.:-
Delafield (R): Deep-tine cultivated twice: 23 Oct, 1972. Power harrowed: 25 Oct. Seed sown: 27 Oct. N applied: 13 Apr, 1973. Weedkiller applied: 18 Apr. Combine harvested: 23 Aug.
Great Hill III (W): Deep-tine cultivated: 23 Oct, 1972. Seed sown: 25 Oct. N applied: 18 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 23 Aug.

Standard errors per plot. Grain, tonnes/hectare.

Delafield (R):	Whole plot:	0.525 or 8.3% (14 d.f.)
	Sub plot:	0.663 or 10.4% (16 d.f.)
Great Hill III (W):	Whole plot:	0.763 or 15.1% (14 d.f.)
	Sub plot:	0.682 or 13.5% (16 d.f.)

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73/R/CS/93 and 73/W/CS/93

TABLES OF MEANS

GRAIN: TONNES/HECTARE

DELAFIELD (R)

	SPACING		VARIETY		N 73		
	30	45	Edward	Crown	37.5	75.0	Mean
FERT 72							
1260	6.93	7.21	7.03	7.11	7.10	7.04	7.07
1880	6.83	6.82	6.79	6.86	6.98	6.67	6.83
2510	6.24	5.95	6.25	5.94	6.33	5.86	6.10
3140	5.68	5.19	5.96	4.91	5.72	5.15	5.44
		SPACING					
		30	6.69	6.15	6.70	6.14	6.42
		45	6.32	6.26	6.36	6.22	6.29
				VARIETY			
				Edward	6.76	6.26	6.51
				Crown	6.31	6.10	6.21
Mean					6.53	6.18	6.36

STANDARD ERRORS OF DIFFERENCES

FERT 72	SPACING	VARIETY	N 73	FERT 72 SPACING	FERT 72 VARIETY	FERT 72 N 73	SPACING VARIETY	SPACING N 73	VARIETY N 73
0.263	0.186	0.166	0.166	0.371	0.352	0.352	0.249	0.249	0.235

Except when comparing means with same level of

FERT 72					0.332	0.332			
SPACING							0.235	0.235	
VARIETY									0.249
N 73									0.249

Mean D.M. % 85.0

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73/R/CS/93 and 73/W/CS/93

GRAIN: TONNES/HECTARE

GREAT HILL III (W)

	SPACING		VARIETY		N 73		
	30	45	Crown	Record	63	126	Mean
FERT 72							
1260	5.45	5.70	5.56	5.58	5.52	5.63	5.57
1880	5.15	4.78	5.29	4.65	5.11	4.82	4.97
2510	5.08	5.08	5.29	4.87	5.10	5.06	5.08
3140	4.39	4.74	4.70	4.43	4.74	4.39	4.57
	SPACING						
	30		5.24	4.80	5.05	4.98	5.02
	45		5.19	4.97	5.19	4.97	5.08
			VARIETY				
			Crown		5.29	5.13	5.21
			Record		4.95	4.82	4.88
Mean					5.12	4.98	5.05

STANDARD ERRORS OF DIFFERENCES

FERT 72	SPACING	VARIETY	N 73	FERT 72 SPACING	FERT 72 VARIETY	FERT 72 N 73	SPACING VARIETY	SPACING N 73	VARIETY N 73
0.381	0.270	0.170	0.170	0.539	0.451	0.451	0.319	0.319	0.241
Except when comparing means with same level of									
FERT 72					0.341	0.341			
SPACING							0.241	0.241	
VARIETY									0.319
N 73									0.319

Mean D.M. % 87.0

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73/R/CS/95

CONTROL OF PESTS AND DISEASES

Object: To study the effect of a range of chemicals on pest and disease incidence and yield of beans using a seed stock free of seed-borne viruses and a site isolated from other bean crops (see also 73/R/BE/5) - West Burnfield I.

Sponsors: A.J. Cockbain, R. Burdner, G.A. Salt.

The second year, spring beans.

For previous year see 72/R/CS/95(t).

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 6.40 x 19.2. Area harvested: 0.00615.

Treatments: Chemicals, applied cumulatively 1972 and 1973 (kg)

	CHEMICAL
None (two plots per block)	None
Aldicarb, nematicide/insecticide, 4.5 as granules	Aldicarb
Gamma BHC, insecticide, 2.2 in 290 l	BHC
Dexon fungicide, 78.5 in 2600 l	Dexon
Dieldrin insecticide, 2.2 in 290 l	Dieldrin

Basal applications: Manures: (0:14:28) at 400 kg placement drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Simazine at 0.84 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- Paraquat applied: 5 Oct, 1972. Treatments applied and all plots rotary cultivated: 13 Mar, 1973. Seed sown: 14 Mar. Simazine applied: 15 Mar. Insecticide applied: 8 June. Combine harvested: 4 Sept.

NOTE: Incidence of viruses was assessed on 9 May, 29 June and 23 July. Adult weevil damage was assessed on 17 May and weevil populations on 8 June. Crop was examined for wilt on 6 June and sampled for root health on 2 Aug.

Standard error per plot.
Grain, tonnes/hectare: 0.217 or 5.7% (16 d.f.)

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73/R/CS/95

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CHEMICAL

None*	Aldicarb	BHC	Dexon	Dieldrin	Mean
3.73	3.78	4.31	3.40	4.01	3.82

STANDARD ERRORS OF DIFFERENCES

CHEMICAL

None v any of remainder 0.133
Between remainder 0.154

Mean D.M. % 83.0

* Duplicated treatment

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73/W/CS/99

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study the phenomenon of 'take-all' (Gaeumannomyces graminis) decline in barley - Woburn Butt Furlong.

Sponsor: D. Hornby.

The second year, barley, spring beans.

For previous year see 72/W/CS/99(t).

Design: 2 blocks of 9 plots.

Whole plot dimensions: 5.33 x 15.2. Area harvested: 0.00434.

Treatments: Previous crops:-

1968-71	1972	PREVCROP
B	B (6 plots per block)	B/B
B	F	B/F

B = Barley, F = Fallow.

Basal applications:

Barley: Manures: 500 kg (20:15:15) combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 280 l.

Spring beans: Manures: (0:14:28) at 370 kg placement drilled. Weedkiller: Simazine at 0.84 kg in 280 l. Insecticide: Phorate at 1.1 kg as granules.

Seed:

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Spring beans: Minor, sown at 190 kg.

Cultivations, etc.:-

All plots: Deep-tine cultivated twice: 31 Aug, 1972, 25 Sept. Ploughed: 21 Dec.

Barley: Seed sown: 13 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 10 Aug.

Spring beans: Seed sown: 27 Feb, 1973. Weedkiller applied: 5 Mar. Insecticide applied: 6 June. Combine harvested: 30 Aug.

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NOTE: Soil samples were taken before sowing and after harvest and plant samples in July for incidence of 'take-all' (Gaeumannomyces graminis).

Standard error per plot. Barley.
Grain, tonnes/hectare: 0.375 or 9.5% (11 d.f.)

TABLES OF MEANS

BARLEY

GRAIN: TONNES/HECTARE

PREVCROP

B/B	B/F	Mean
3.85	4.56	3.95

STANDARD ERROR OF DIFFERENCES

PREVCROP

0.287

Mean D.M. % 84.2

SPRING BEANS

GRAIN: TONNES/HECTARE

Mean

3.26

Mean D.M. % 81.8

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73/R/CS/102

NEMATICIDES AND DITYLENCHUS

Object: To study direct and residual effects of nematicides on yields of onions and incidence of Ditylenchus dipsaci (see also 73/R/CS/127) - Great Field II.

Sponsor: A.G. Whitehead.

The second year, onions.

For previous year see 72/R/CS/102(t).

Design: 3 blocks of 10 plots split systematically into half and quarter plots.

Whole plot dimensions: 1.52 x 6.10. Area harvested: 0.00012.

Treatments:

Whole plots: 1. Nematicide and rate (kg a.i.) 1972 — NEM1972

None		None
Aldicarb	1.57	Aldcarb1
Aldicarb	3.14	Aldcarb2
Aldicarb	6.28	Aldcarb4
CGA V10576	1.12	CGA1
CGA V10576	2.24	CGA2
CGA V10576	4.48	CGA4
DuPont V1410	1.46	Dupont1
DuPont V1410	2.92	Dupont2
DuPont V1410	5.84	Dupont4

Strips of Half plots: 2. Sowing method 1973: — SOWING

On the flat	Flat
On ridges	Ridge

Strips of Quarter plots: 3. Nematicide 1973: — NEM1973

None	None
Aldicarb at 5 kg	Aldicarb

Basal applications: Manures: (13:13:20) at 1900 kg . Weedkillers: Propachlor ('Ramrod' at 6.7 kg), pyrazon with chlorbufam ('Alicep' at 4.5 kg in 450 l).

Seed: Robusta, fumigated with methyl bromide.

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Cultivations, etc.:- Ploughed: 30 Nov, 1972. NPK applied: 26 Mar, 1973. Power harrowed: 27 Mar. Seed sown, aldicarb and propachlor applied: 28 Mar. Pyrazon with chlorbufam applied: 24 May. Hand weeded: 30 May, 5, 11 June and 4 July. Lifted: 3 Sept.

NOTES:
1. Onions were allowed to dry in the field and stored during the winter for observations of incidence of rots.
2. The yields of the NEM1973 None plots were poor and very variable. Separate analyses were made for NEM1973 None and NEM1973 Aldicarb plots and standard errors are presented for the latter only.
3. Five plots SOWING - Flat, NEM1973 - None, NEM1972 - CGA1, Aldcarb2, CGA2, Dupont1, CGA4 received the incorrect treatment. Estimated values were used in the analysis.

Standard errors per plot. Sound onions: tonnes/hectare:
NEM1973 Aldicarb only
Whole plot: 4.62 or 8.9% (18 d.f.)
Half plot: 4.89 or 9.4% (20 d.f.)

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73/R/CS/102

TABLES OF MEANS

SOUND ONIONS: TONNES/HECTARE

NEM1973 SOWING	None			Aldicarb		
	Flat	Ridge	Mean	Flat	Ridge	Mean
NEM1972						
None	15.0	17.3	16.1	49.0	49.0	49.0
Aldcarb1	1.0	3.3	2.1	56.0	54.7	55.3
Aldcarb2	34.4	31.6	33.0	58.3	47.5	52.9
Aldcarb4	2.2	14.2	8.2	49.7	52.2	51.0
CGA1	2.2	0.7	1.4	58.3	53.8	56.1
CGA2	9.2	21.1	15.1	55.9	57.5	56.7
CGA4	27.9	9.8	18.8	53.8	46.9	50.3
Dupont1	26.9	26.7	26.8	57.9	47.1	52.5
Dupont2	10.2	20.3	15.2	54.3	46.0	50.1
Dupont4	13.4	20.2	16.8	52.7	41.5	47.1
Mean	14.2	16.5	15.4	54.6	49.6	52.1

Grand Mean 34.0

STANDARD ERRORS OF DIFFERENCES
NEM1973 Aldicarb only

NEM1972	SOWING	NEM1972 SOWING
3.77	1.26	4.71

Except when comparing means with same level of NEM1972 3.99

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73/W/CS/103

SIMAZINE RATES AND SOIL TYPES

Object: To study the residual effects on heavy and light soils containing different amounts of organic matter of simazine and other weedkillers applied to beans on the yield of winter wheat - Woburn, Warren Field II, White Horse, Great Hill Bottom I.

Sponsors: J.R. Moffatt, A.E. Johnston, G.G. Briggs.

The second year, winter wheat.

For previous year see 72/W/CS/103(t).

Design: Warren Field II, White Horse: 4 blocks of 15 plots.
Great Hill Bottom I: 3 blocks of 15 plots.

Whole plot dimensions:
Warren Field II, White Horse: 4.26 x 12.2. Area harvested: 0.00347.
Great Hill Bottom I: 4.26 x 9.14. Area harvested: 0.00260.

Treatments (to beans 1972): All combinations of:-

1. Weedkiller: WEEDKLLR

   Simazine — Simazine
   Simazine with trietazine (1:7) — Sim/Tri

2. Rate of weedkiller (kg): RATE

	Warren Field II	White Horse & Gt Hill Bottom I		
50% below normal for soil type	0.56	0.42	0.56	0.42
Normal rate for soil type	1.12	0.84	1.12	0.84
50% above normal for soil type	1.68	1.26	1.68	1.26

3. Times of applying weedkiller: TIME

   Early, day after sowing — Early
   Late, 10 days after sowing on White Horse and Warren Field II, 37 days after sowing on Great Hill Bottom I — Late

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together with three extra treatments — EXTRA

No weed control	None
Mechanical cultivation	Mechanl
Chlorpropham with diuron ('New Residuren' at 4.2 l on White Horse and Great Hill Bottom I, 5.6 l on Warren Field II) applied the day after sowing.	Chlor/di

Basal applications: Manures: (8:20:16) at 310 kg, combine drilled. N at 100 kg as 'Nitro-Chalk' on Warren Field II and White Horse, N at 110 kg as 'Nitro-Chalk' on Great Hill Bottom I. Weedkillers: Paraquat at 0.56 kg ion in 280 l on Warren Field II only. Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l on all fields.

Seed: Maris Huntsman, sown at 190 kg.

Cultivations, etc.:-

Warren Field II: Paraquat applied: 29 Sept, 1972. Deep-tine cultivated three times: 9 Oct, 13 Oct, 14 Oct. Rotary cultivated: 18 Oct. Seed sown: 20 Oct. N applied: 18 Apr, 1973. Ioxynil plus mecoprop applied: 26 Apr. Combine harvested: 31 Aug.

White Horse: Ploughed: 18 Oct, 1972. Seed sown: 23 Oct. N applied: 18 Apr, 1973. Weedkiller applied: 21 Apr. Combine harvested: 31 Aug.

Great Hill Bottom I: Deep-tine cultivated twice: 7 Oct, 1972. Seed sown: 23 Oct. N applied: 18 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 31 Aug.

Standard errors per plot.	Grain, tonnes/hectare.
Warren Field II:	0.567 or 7.1% (42 d.f.)
White Horse:	0.401 or 7.2% (42 d.f.)
Great Hill Bottom I:	0.222 or 2.7% (28 d.f.)

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73/W/CS/103

TABLES OF MEANS

GRAIN: TONNES/HECTARE

WARREN FIELD II (W)

	RATE			TIME		
	0.56	1.12	1.68	Early	Late	Mean
WEEDKLLR						
Simazine	8.27	8.07	7.93	8.28	7.91	8.09
Sim/Tri	7.61	7.82	7.81	7.58	7.91	7.75
			RATE			
			0.56	7.98	7.90	7.94
			1.12	7.87	8.02	7.95
			1.68	7.92	7.81	7.87
Mean				7.93	7.91	7.92

EXTRA

None	Mechancl	Chlor/di
8.30	8.07	8.24

STANDARD ERRORS OF DIFFERENCES

WEEDKLLR	RATE	TIME	EXTRA	WEEDKLLR RATE	WEEDKLLR TIME	RATE TIME
0.164	0.200	0.164	0.401	0.283	0.231	0.283

Grand mean 7.98

Mean D.M. % 82.0

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73/W/CS/103

GRAIN: TONNES/HECTARE

WHITE HORSE (W)

	RATE			TIME		
	0.42	0.84	1.26	Early	Late	Mean
WEEDKLLR						
Simazine	5.83	5.52	5.55	5.85	5.41	5.63
Sim/Tri	5.53	5.63	5.40	5.58	5.46	5.52
			RATE			
			0.42	5.77	5.59	5.68
			0.84	5.67	5.47	5.57
			1.26	5.70	5.24	5.47
Mean				5.72	5.43	5.57

EXTRA

None	Mechancl	Chlor/di
5.62	5.39	5.76

STANDARD ERRORS OF DIFFERENCES

WEEDKLLR	RATE	TIME	EXTRA	WEEDKLLR RATE	WEEDKLLR TIME	RATE TIME
0.116	0.142	0.116	0.283	0.200	0.164	0.200

Grand mean 5.58

Mean D.M. % 82.3

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73/W/CS/103

GRAIN: TONNES/HECTARE

GT HILL BOTTOM I (W)

	RATE			TIME		
	0.42	0.84	1.26	Early	Late	Mean
WEEDKLLR						
Simazine	8.08	8.28	8.27	8.25	8.17	8.21
Sim/Tri	8.35	8.32	8.04	8.20	8.28	8.24
			RATE			
			0.42	8.15	8.28	8.22
			0.84	8.39	8.21	8.30
			1.26	8.14	8.17	8.16
Mean				8.23	8.22	8.22

EXTRA

None	Mechancl	Chlor/di
8.38	8.55	8.46

STANDARD ERRORS OF DIFFERENCES

WEEDKLLR	RATE	TIME	EXTRA	WEEDKLLR RATE	WEEDKLLR TIME	RATE TIME
0.074	0.091	0.074	0.181	0.128	0.105	0.128

Grand mean 8.27

Mean D.M. % 83.1

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73/R/CS/106

CHEMICAL CONTROL OF PATHOGENS

Object: To study the effects of a range of chemicals on the yield and pathogens of ryegrass - Claycroft.

Sponsors: J.F. Jenkyn, E.W. Broom, R.T. Plumb.

The first year, ryegrass.

Design: 3 randomised blocks of 10 plots split into 3.

Whole plot dimensions: 4.27 x 16.7. Area harvested: 0.00050.

Treatments: All combinations of:-

Whole plots: 1. Chemicals (kg a.i.):-

	CHEMICAL
None, 3 plots per block	0
BAS 3170F 1.12 kg per cut	BA
Benomyl 1.12 kg per cut	BE
Captafol 2.24 kg per cut	CA
Dazomet 400 kg September 1972 only	DA
Endosulfan 2.8 l of 'Thiodan' per cut	EN
Menazon 0.7 l of 'Saphi-Col' per cut	ME
Endosulfan + menazon at above rates	EN+ME

Sub plots: 2. Compound fertiliser 25:0:16 applied for each cut (kg N)

	NPERCUT
38	38
75	75
150	150

NOTE: All chemicals in 1973 were applied in 290 l except endosulfan, in 580 l.

Basal applications: Manures: (0:14:28) at 1300 kg.

Seed: Gremie sown at 45 kg.

Cultivations, etc.:- Ploughed: 13 Sept, 1972. Disced twice: 18 Sept. Dazomet applied and all plots rotary cultivated: 20 Sept. Deep-tine cultivated: 3 Nov. Basal PK applied: 26 Mar, 1973. Power harrowed: 27 Mar. NK treatments applied: 30 Mar, 23 July. Seed sown: 10 Apr. All chemicals (except dazomet) applied: 4 June. Cut twice: 18 July, 11 Sept. All chemicals (except captafol and dazomet) applied: 24 July. Captafol applied: 30 July. Previous crops: Wheat 1971 and 1972.

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NOTE: Observations were made in autumn of Crown rust (Puccinia coronata) Mildew (Erysiphe graminis) and Ryegrass Mosaic Virus.

Standard errors per plot. Dry matter, tonnes/hectare:

1st cut:	Whole plot:	0.256 or 7.4%	(20 d.f.)
	Sub plot:	0.368 or 10.6%	(44 d.f.)
2nd cut:	Whole plot:	0.258 or 14.6%	(20 d.f.)
	Sub plot:	0.290 or 16.4%	(44 d.f.)
Total of 2 cuts:	Whole plot:	0.457 or 8.7%	(20 d.f.)
	Sub plot:	0.542 or 10.4%	(44 d.f.)

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T3/R/CS/106

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

CHEMICAL

	O	BA	BE	CA	DA	EI	ME	FN+ME	Mean
NPERCUT									
38	2.76	2.93	2.73	2.79	4.21	2.69	3.10	2.86	2.96
75	3.34	3.41	3.52	2.86	4.37	3.51	3.18	3.23	3.41
150	3.83	4.24	4.00	3.64	4.72	3.37	4.57	3.91	3.99
Mean	3.31	3.53	3.42	3.10	4.43	3.19	3.62	3.33	3.45

STANDARD ERRORS OF DIFFERENCES

	NPERCUT	CHEMICAL	NPERCUT CHEMICAL
	0.095		
O v any of remainder		0.170	0.263
Between any of remainder		0.209	0.322
Except when comparing means with same level of CHEMICAL			
O			0.173
O v any of remainder			0.245
Between remainder			0.300

Mean D.M. % 16.3

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73/R/CS/106

DRY MATTER: TONNES/HECTARE

2ND CUT

CHEMICAL

	0	BA	BE	CA	DA	EN	ME	EN+ME	Mean
NPERCUT									
38	0.99	0.97	1.07	0.85	1.80	0.65	1.07	1.08	1.05
75	1.81	2.12	2.00	1.36	2.11	1.70	1.84	2.06	1.86
150	2.40	2.62	2.67	2.10	2.58	1.93	2.43	2.59	2.41
Mean	1.73	1.90	1.91	1.44	2.17	1.43	1.78	1.91	1.77

STANDARD ERRORS OF DIFFERENCES

	NPERCUT	CHEMICAL	NPERCUT CHEMICAL
	0.075		
0 v any of remainder		0.172	0.234
Between any of remainder		0.211	0.286
Except when comparing means with same level of CHEMICAL			
0			0.137
0 v any of remainder			0.194
Between remainder			0.237

Mean D.M. % 33.3

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73/R/C 3/106

DRY MATTER: TONNES/HECTARE

TOTAL OF 2 CUTS

CHEMICAL

	O	EA	EE	CA	DA	EM	ME	EE+ME	Mean
NPERCUT									
38	3.75	3.89	3.81	3.65	6.01	3.34	4.16	3.94	4.00
75	5.14	5.54	5.52	4.22	6.49	5.22	5.02	5.29	5.27
150	6.23	6.05	6.67	5.74	7.31	5.30	7.01	6.50	6.41
Mean	5.04	5.43	5.33	4.53	6.60	4.62	5.40	5.24	5.23

STANDARD ERRORS OF DIFFERENCES

	NPERCUT	CHEMICAL	NPERCUT CHEMICAL
	0.140		
O v any of remainder		0.305	0.424
Between any of remainder		0.373	0.520
Except when comparing means with same level of CHEMICAL			
O			0.256
O v any of remainder			0.361
Between remainder			0.443

Mean D.M.% 24.8

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73/R/CS/107

RYEGRASS, VARIETIES AND PATHOGENS

Object: To compare the yields and susceptibilities to diseases of a range of Italian and Perennial Ryegrass varieties - Long Hoos IV.

Sponsors: R.T. Plumb, J.F. Jenkyn.

The first year, Italian and perennial ryegrass.

Design: 2 blocks of 2 whole plots split into 5 (Italian), 6 (Perennial) sub plots.

Whole plot dimensions: 2.13 x 6.10. Sub plot area harvested: 0.00056.

Treatments:-

Whole plots: 1. Ryegrass type:-

	TYPE
Italian	Italian
Perennial	Perennal

Sub plots: 2. Varieties and sowing time:-

	VARIETY
Italian varieties (sown autumn 1972 except where stated):	
Asso, sown spring 1973	Asso(S)
Grasslands Manawa	Manawa
R.V.P.	RVP
R.V.P., sown spring 1973	RVP(S)
S.22	S.22
Perennial varieties (all sown autumn 1972):	
Endura	Endura
Glasnevin Leafy	Glasnevi
Gremie	Gremie
Monta C.I.V.	Monta
Reveille	Reveille
S.24	S.24

Basal applications: Manures: (0:14:28) at 900 kg. 'Nitro-Chalk' at 150 kg before sowing. (25:0:16) at 300 kg in spring and after each cut except the last.

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Seed: Sown at 45 kg.

Cultivations, etc.:- Basal N and PK applied, rotary cultivated: 3 Oct, 1972. Seed sown (except Asso and RVP(S)): 12 Oct. NK applied to all sown plots: 9 Apr, 1973. Power harrowed, Asso(S) and RVP(S) sown: 27 Apr. Autumn sown plots cut: 7 June. NK applied to all plots: 18 June, 25 July. All plots cut: 18 July, 12 Sept, 23 Oct. Previous crops: Winter wheat 1971 and 1972.

NOTES: (1) Scores for Ryegrass Mosaic Virus and Crown Rust (Puccinia coronata) were made between third and fourth cuts.
(2) Asso(S) and RVP(S) were not ready to cut until 18 July.
(3) Spring sown plots did not receive basal N in seedbed or NK in spring.

Standard errors per sub plot. Dry matter, tonnes/hectare:

1st cut:	0.331 or 7.0% (9 d.f.)
2nd cut:	0.324 or 9.2% (9 d.f.)
3rd cut:	0.210 or 8.5% (9 d.f.)
4th cut:	0.070 or 4.8% (9 d.f.)
Total of 4 cuts:	0.493 or 4.1% (9 d.f.)

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73/R/CS/107

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

TYPE	Italian					Perennal						
VARIETY	Asso(S)	Manawa	RVP	RVP(S)	S22	Endura	Glasnevi	Gremie	Monta	Reveille	S24	Mean
1ST CUT 7/6/73												
	0.00	6.26	6.25	0.00	6.57	4.53	5.84	5.96	5.69	4.71	5.90	4.70
2ND CUT 18/7/73												
	4.23	4.36	4.61	3.92	3.99	3.37	2.59	2.86	3.09	2.86	2.72	3.51
3RD CUT 12/9/73												
	2.86	3.01	2.67	2.77	2.37	2.54	2.39	2.26	2.16	1.78	2.48	2.48
4TH CUT 23/10/73												
	1.23	1.26	1.44	1.52	1.30	1.62	1.38	1.49	1.50	1.65	1.54	1.45
TOTAL OF 4 CUTS												
	8.33	14.90	14.97	8.21	14.22	12.05	12.20	12.58	12.45	11.01	12.64	12.14

STANDARD ERRORS OF DIFFERENCES. For use only in comparison within the same TYPE

1st cut	0.331	Mean D.M. %	14.4
2nd cut	0.324		15.3
3rd cut	0.210		36.7
4th cut	0.070		16.1
Total of 4 cuts	0.493		20.6

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73/R/CS/109

BENOMYL AND SCLEROTINIA

Object: To study the effects of times of applying benomyl on yield and incidence of Sclerotinia rot of clover - Fosters O & E III.

Sponsor: J.F. Jenkyn.

The first year, red clover.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 4.27 x 4.27. Area harvested: 1st cut: 0.00036. 2nd cut: 0.00039.

Treatments: Times of applying benomyl:	BENOMYL
None (6 plots per block)	None
Two sprays, early Sept and early Oct	Early
Two sprays, early Oct and early Nov	Middle
Two sprays, early Nov and early Dec	Late
Five sprays, early Sept until early Jan	Overall

NOTES: (1) Benomyl applied 12 Sept, 1972, 12 Oct, 3 Nov, 12 Dec, and 5 Jan, 1973, at 0.56 kg in 340 l.
(2) Sclerotinia infected soil was spread on all plots on 7 Sept, 1972.

Basal applications: Manures: (0:14:28) at 540 kg and Epsom salts at 350 kg. Muriate of potash at 130 kg in spring and after each cut.

Seed: S123, sown spring 1972 at 31 kg.

Cultivations, etc.:- Basal PK and Epsom salts applied: 8 Mar, 1973. K applied: 3 Apr. Cut twice: 25 June, 3 Sept. K applied: 4 July, 14 Sept. Previous crops: Beans 1970, winter wheat 1971.

Standard errors per plot.

Dry matter: tonnes/hectare:	1st cut:	0.929 or 15.7% (23 d.f.)
	2nd cut:	0.336 or 7.6% (23 d.f.)
	Total of 2 cuts:	1.028 or 9.9% (23 d.f.)

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73/R/CS/109

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

BENOMYL

None	Early	Middle	Late	Overall	Mean
		1ST CUT			
5.58	5.57	6.59	6.23	7.37	5.92
		2ND CUT			
4.23	4.56	4.82	4.86	4.53	4.42
		TOTAL OF 2 CUTS			
9.81	10.13	11.41	11.09	11.90	10.34

STANDARD ERRORS OF DIFFERENCES

BENOMYL	1st cut	2nd cut	Total of 2 cuts
None v any of remainder	0.580	0.209	0.641
Between any of remainder	0.759	0.274	0.840
Mean D.M. %	16.3	22.4	19.3

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73/R/CS/110 and 73/W/CS/110

FERTILISER AND FYM

Object: To study the effects of a range of rates of NPK fertiliser, P and K being applied in autumn or spring, and FYM on the yields of potatoes - Rothamsted, Stackyard (R) and Woburn, Great Hill II (W).

Sponsor: F.V. Widdowson.

The first year, potatoes.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 16.2. Area harvested: 0.00230.

Treatments: All combinations of:-

1. Farmyard manure (tonnes) to supply 377 kg N:	FYM
None	0 0
80 Stackyard (R), 63 Great Hill II (W)	80 63

2. N, in spring and PK fertilisers to give rates of nitrogen* (kg N):	N
188	188
377	377
565	565

3. Times of applying PK fertilisers	TIME
All in autumn	Autumn
All in spring	Spring
Half in autumn, half in spring	Aut/Spng

* The ratio of N:P2O5:K2O was 1:1.5:1.5 for all N treatments.

Basal applications:

Stackyard (R): Weedkiller: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 450 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 370 l. Fungicide: Mancozeb at 1.3 kg in 370 l.

Great Hill II (W): Manures: Magnesian limestone at 7.5 tonnes. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

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Seed: Stackyard (R): King Edward.
Great Hill II (W): Maris Piper.

Cultivations, etc.:-
Stackyard (R): Autumn PK applied: 31 Oct, 1972. FYM applied, ploughed: 3 Nov. Spring PK applied: 28 Mar, 1973. N applied, rotary cultivated, potatoes planted: 11 Apr. Weedkiller applied: 15 May. Grubbed: 7 June. Rotary ridged: 11 June. Fungicide with insecticide applied: 2 July. Fungicide applied: 18 July, 9 Aug. Haulm mechanically destroyed: 17 Sept. Sprayed with undiluted BOV at 220 l: 18 Sept. Lifted: 2 Oct. Previous crops: Wheat 1971, fallow 1972.
Great Hill II (W): Magnesian limestone applied: 19 Sept, 1972. Autumn PK applied: 16 Nov. FYM applied, ploughed: 29 Nov. Spring PK applied: 29 Mar, 1973. N applied: 3 Apr. Rotary cultivated, potatoes planted: 6 Apr. Weedkiller applied: 9 May. Grubbed: 31 May. Rotary ridged: 5 June. Fungicide with insecticide applied: 6 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 12 Sept. Lifted: 14 Sept. Previous crops: Potatoes 1971, winter wheat 1972.

NOTES: (1) Leaf samples were taken in July for percentage of Mg and K.
(2) Tuber samples were taken at grading for percentage of N, P and K.
(3) Tuber samples were taken for cooking tests by N.I.A.B.

Standard errors per plot. Total tubers, tonnes/hectare:
Stackyard (R): 2.75 or 5.4% (34 d.f.)
Great Hill II (W): 2.82 or 7.2% (34 d.f.)

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73/R/CS/110 and 73/W/CS/110

TABLES OF MEANS

STACKYARD (R)

TOTAL TUBERS: TONNES/HECTARE

	N			TIME			
	188	377	565	Autumn	Spring	Aut/Spng	Mean
FYM							
0	50.2	49.6	49.2	49.7	48.9	50.4	49.6
80	55.3	52.8	49.6	53.1	51.8	52.8	52.6
N							
188				51.1	54.2	53.0	52.7
377				52.8	48.0	52.8	51.2
565				50.3	48.9	48.9	49.4
Mean				51.4	50.3	51.6	51.1

N	188			377			565		
TIME	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng
FYM									
0	48.0	51.9	50.8	51.4	45.5	51.8	49.8	49.2	48.5
80	54.2	56.4	55.2	54.1	50.5	53.8	50.8	48.5	49.4

STANDARD ERRORS OF DIFFERENCES

FYM	N	TIME	FYM N	FYM TIME	N TIME	FYM N TIME
0.75	0.92	0.92	1.30	1.30	1.59	2.24

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STACKYARD (R)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	N			TIME			
	188	377	565	Autumn	Spring	Aut/Spng	Mean
FYM							
0	78.9	83.4	81.7	84.2	79.9	79.8	81.3
80	83.8	81.8	83.2	84.4	82.3	82.1	82.9
N							
188				83.8	80.4	79.8	81.3
377				85.0	80.3	82.5	82.6
565				84.1	82.6	80.7	82.5
Mean				84.3	81.1	81.0	82.1

N	188			377			565		
TIME	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng
FYM									
0	82.2	77.8	76.7	85.2	80.3	84.7	85.4	81.7	78.0
80	85.4	83.0	82.9	84.8	80.2	80.2	82.9	83.5	83.3

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GREAT HILL II (W)

TOTAL TUBERS: TONNES/HECTARE

	N			TIME			
	188	377	565	Autumn	Spring	Aut/Spng	Mean
FYM							
0	33.2	40.9	41.4	36.7	39.6	39.3	38.5
63	35.1	43.3	42.1	37.6	41.7	41.1	40.2
N							
188				31.8	35.9	34.7	34.1
377				38.9	43.2	44.3	42.1
565				40.8	42.8	41.5	41.7
Mean				37.2	40.6	40.2	39.3

N	188			377			565		
TIME	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng
FYM									
0	30.4	34.2	35.0	38.2	41.9	42.8	41.6	42.5	40.0
63	33.1	37.6	34.4	39.6	44.5	45.9	40.1	43.0	43.0

STANDARD ERRORS OF DIFFERENCES

FYM	N	TIME	FYM N	FYM TIME	N TIME	FYM N TIME
0.77	0.94	0.94	1.33	1.33	1.63	2.30

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GREAT HILL II (W)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	N			TIME			
	188	377	565	Autumn	Spring	Aut/Spng	Mean
FYM							
0	53.2	66.6	68.7	60.2	65.0	63.2	62.8
63	58.9	67.1	67.3	62.4	65.4	65.5	64.4
N							
188				53.2	58.5	56.5	56.1
377				64.5	68.6	67.3	66.8
565				66.2	68.4	69.3	68.0
Mean				61.3	65.2	64.3	63.6

N	188			377			565		
TIME	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng	Autumn	Spring	Aut/Spng
FYM									
0	49.9	54.3	55.3	63.0	69.3	67.4	67.8	71.5	66.8
63	56.5	62.7	57.7	66.1	68.0	67.1	64.7	65.4	71.8

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73/R/CS/113

EFFECTS OF COLLEMBOLA ON SEEDLINGS

Object: To study the effects of insecticides on seedling damage by Collembola and yield of sugar beet - West Barnfield I.

Sponsor: C.A. Edwards.

The second year, sugar beet.

For previous year see 72/R/SB/1(t).

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 4.57. Area harvested: 0.00146.

Treatments: Insecticides (kg), applied cumulatively to treatments in 1972:-

	INSCTCDE
None	None
Chlorfenvinphos, 4.5	Chlorfen
Diazinon, 4.5	Diazinon
DDT, 6.7	DDT
Parathion, 4.5	Parathio

Treatments applied to the soil and all plots spring-tine cultivated: 7 Feb, 1973.

Basal applications: Manures: (20:15:15) at 750 kg.

Seed: Amono, pelleted, sown at 13 kg.

Cultivations, etc.:- Ploughed: 27 Nov, 1972. NPK applied and power harrowed: 21 Mar, 1973. Seed sown: 23 Mar. Crop singled: 31 May. Tractor hoed: 6 June. Side hoed: 4 July. Lifted: 19 Nov.

NOTES: (1) Soil cores were taken before applying treatments and monthly through the growing season for counts of soil fauna.
(2) Plants were counted three times during the season.

Standard errors per plot.
Roots (washed): tonnes/hectare: 5.91 or 18.0% (12 d.f.)
Total sugar: tonnes/hectare: 0.944 or 17.5% (12 d.f.)

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73/R/CS/113

TABLES OF MEANS

SUGAR BEET

INSCTCDE

None	Chlorfen	Diazinon	DDT	Parathio	Mean
ROOTS (WASHED): TONNES/HECTARE					
35.6	32.2	29.9	32.9	33.7	32.9

STANDARD ERROR OF DIFFERENCES

INSCTCDE

4.18

SUGAR %

16.1	16.5	16.4	16.7	16.3	16.4
TOTAL SUGAR: TONNES/HECTARE					
5.75	5.33	4.91	5.51	5.49	5.40

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.668

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73/R/CS/116

EFFECTS OF STEM EELWORM

Object: To study the effects of applying field bean straw infested with two races of stem eelworm Ditylenchus dipsaci on the yield and subsequent infestation of field beans - Highfield O and E III.

Sponsor: D.J. Hooper.

The first year, spring beans.

Design: 3 randomised blocks of 6 plots.

Whole plot dimension: 4.27 x 9.14. Area harvested: 0.00293.

Treatments: All combinations of:-

	EELWORM
1. Bean straw infested with stem eelworm, Ditylenchus dipsaci, worked into soil, autumn 1972:-	
Oat race	Oat
Giant race	Giant
2. Rate of application of straw (tonnes) to give populations of eelworms:-	RATE
None	0
Single, 3.1	Single
Double, 6.2	Double

Basal applications: Manures: (0:14:28) at 900 kg. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Phorate at 1.2 kg as granules on two occasions.

Seed: Minor sown at 220 kg.

Cultivations, etc.:- Ploughed: 16 Sept, 1972. PK applied: 27 Oct. Straw applied and all plots rotary cultivated: 3 Nov. Seed sown: 12 Mar, 1973. Weedkiller applied: 13 Mar. Insecticide applied: 11 June, repeated 19 June. Combine harvested: 4 Sept. Previous crops: Barley 1971 and 1972.

NOTE: Counts of stems showing symptoms of attack by stem eelworm made in July. Samples of seed were taken at maturity for the assessment of seed infestation.

Standard error per plot.
Grain, tonnes/hectare: 0.167 or 7.3% (11 d.f.)

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73/R/CS/116

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	RATE			
	0	Single	Double	Mean
EELWORM				
Cat		3.06	2.17	2.62
Giant		1.43	1.24	1.34
Mean	2.92	2.25	1.71	2.29*

STANDARD ERRORS OF DIFFERENCES

EELWORM	RATE	EELWORM RATE
0.097	0.097	0.137

Mean D.M. % 82.2

* Grand mean

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73/R/CS/123

EFFECTS OF VIRUSES

Object: To study the effects of virus infection on yield and persistence of ryegrass and red clover in pure and mixed stands - Garden Plot 14.

Sponsors: A.J. Cockbain and R.T. Plumb.

The first year, red clover and Italian ryegrass.

Design: 4 randomised blocks of 8 plots split into 2.

Whole plot dimensions: 3.35 x 1.22. Area harvested: 0.00015.

Treatments: All combinations of:-

Whole plots: 1. Crop and inoculation with virus:	CROP/VIR
Red clover uninoculated	Clover/0
Italian ryegrass uninoculated	Grass/0
Red clover and Italian ryegrass (mixed within rows) uninoculated	CloGr/0
Red clover inoculated with Pea Mosaic Virus (PMV)	Clover/P
Italian ryegrass inoculated with Ryegrass Mosaic Virus (RMV)	Grass/R
Red clover and Italian ryegrass (mixed) inoculated with PMV	CloGr/P
Red clover and Italian ryegrass (mixed) inoculated with RMV	CloGr/R
Red clover and Italian ryegrass (mixed) inoculated with PMV and RMV	CloGr/PR

Sub plots:	2. Aldicarb (kg) before sowing, repeated after each cut:	ALDICARB
	None	0
	10	10

Basal applications: Manures: Ground chalk at 2.4 tonnes, (0:20:20) at 780 kg, 'Nitro-Chalk' at 300 kg at sowing and after first cut.
Irrigation: 15 mm after first cut.

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Seed: Hungaropoly clover and R.V.P ryegrass both sown at 40 kg in pure stands and 32 kg clover with 8 kg ryegrass in mixture.

Cultivations, etc.:- Ploughed: 1 Dec, 1972. Seed sown and aldicarb applied: 18 Apr, 1973. Cut: 31 July and 10 Oct. Irrigation applied: 3 Aug. Aldicarb applied: 8 Aug.

NOTES. Crop was scored for:-
(1) Ryegrass mosaic virus: 23 July and 16 Aug.
(2) Mites (Abacarus hystrix): 27 July.
(3) Clover virus (PMV) : 24 Sept.
(4) Mildew (Erysiphe polygoni) on clover: 23 Aug.

Standard errors per plot. Dry matter, tonnes/hectare:

1st cut:	Whole plot:	0.695 or 11.4% (21 d.f.)
	Sub plot:	0.515 or 8.4% (24 d.f.)
2nd cut:	Whole plot:	0.489 or 11.3% (21 d.f.)
	Sub plot:	0.567 or 13.1% (24 d.f.)
Total of 2 cuts:	Whole plot:	0.836 or 8.0% (21 d.f.)
	Sub plot:	0.922 or 8.9% (24 d.f.)

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73/R/CS/123

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

ALDICARB

CROP/VIR	0	10	Mean
	1ST CUT		
Clover/O	5.74	6.32	6.03
Grass/O	5.94	6.17	6.05
CloGr/O	6.22	6.91	6.57
Clover/P	5.43	5.42	5.42
Grass/R	6.88	6.66	6.77
CloGr/P	5.31	6.44	5.88
CloGr/R	5.50	6.22	5.86
CloGr/PR	5.97	6.41	6.19
Mean	5.87	6.32	6.10

STANDARD ERRORS OF DIFFERENCES

CROP/VIR	ALDICARB	CROP/VIR ALDICARB
0.491	0.129	0.555
Except when comparing means with same level of CROP/VIR		0.364

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73/R/05/123

DRY MATTER: TONNES/HECTARE

ALDICARB

CROP/VIR	0	10	Mean
	2ND CUT		
Clover/0	4.54	5.06	4.80
Grass/0	3.15	3.80	3.47
CloGr/0	4.41	4.73	4.57
Clover/P	3.92	4.14	4.03
Grass/P	3.55	3.90	3.73
CloGr/P	4.59	4.74	4.67
CloGr/P	4.68	5.05	4.86
CloGr/PP	4.27	4.49	4.38
Mean	4.14	4.49	4.31

STANDARD ERRORS OF DIFFERENCES

CROP/VIR	ALDICARB	CROP/VIR ALDICARB
0.345	0.142	0.447
Except when comparing means with same level of CROP/VIR		0.401

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73/R/CS/123

DRY MATTER: TONNES/HECTARE

ALDICARB

CROP/VIR	0	10	Mean
	TOTAL OF 2 CUTS		
Clover/0	10.28	11.39	10.83
Grass/0	9.08	9.97	9.53
CloGr/0	10.63	11.64	11.13
Clover/P	9.35	9.55	9.45
Grass/R	10.43	10.56	10.49
CloGr/P	9.91	11.18	10.55
CloGr/R	10.18	11.27	10.72
CloGr/PR	10.24	10.90	10.57
Mean	10.01	10.81	10.41

STANDARD ERRORS OF DIFFERENCES

CROP/VIR	ALDICARB	CROP/VIR ALDICARB
0.591	0.231	0.750
Except when comparing means with same level of CROP/VIR		0.652

Mean D.M. % 1st cut: 19.0
2nd cut: 22.3
Total of 2 cuts: 20.7

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73/R/CS/125

VARIETIES AND ALDICARB

Object: To study the effects of previous cropping and aldicarb on yield and incidence of Heterodera avenae on three varieties of spring oats - Pennell's Piece.

Sponsor: T.D. Williams.

The first year, oats. The experiment is sited on what was previously the spring wheat series of the Cereal Disease Reference Plots (see 73/R/RN/9).

Design: 2 randomised blocks of 6 plots split into 2 breadthways for aldicarb and 3 lengthways for variety.

Whole plot dimensions: 4.27 x 17.1. Area harvested: 0.00091.

Treatments: All combinations of:-

Whole plots: 1. Previous crops:

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	PREVCROP
W	W	W	BE	O	W	W	W	BE	O	W/W/BE/O
W	W	BE	O	W	W	W	BE	O	W	W/BE/O/W
W	BE	O	W	W	W	BE	O	W	W	BE/O/W/W
BE	O	W	W	W	BE	O	W	W	W	O/W/W/W
O	W	W	W	BE	O	W	W	W	BE	W/W/W/BE
W	W	W	W	W	W	W	W	W	W	W/W/W/W

where W = spring wheat, BE = spring beans, O = spring oats

Sub plots: 2. Aldicarb (kg): ALDICARB

None	0
5	5

3. Varieties: VARIETY

Nelson, resistant to Heterodera avenae	Nelson
Mostyn, susceptible to Heterodera avenae	Mostyn
Weibull's W16840, resistant to Heterodera avenae	W16840

Basal applications: Manures: Ground chalk at 10 tonnes. (0:20:20) at 1300 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 290 l).

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Seed: Sown at 190 kg.

Cultivations, etc.:- Ploughed: 12 Oct, 1972. Chalk applied: 30 Oct. PK applied: 28 Feb, 1973. Aldicarb applied and rotary cultivated: 13 Mar. Seed sown: 14 Mar. Weedkiller applied: 21 May. Combine harvested: 22 Aug.

NOTE: Soil samples were taken for determination of initial eelworm population on 27 Feb, 1973 and for final population on 30 Aug.

Standard errors per plot. Grain: tonnes/hectare.

Whole plot:		0.676 or 14.5%	(5 d.f.)
Sub plot:	ALDICARB:	0.328 or 13.7%	(6 d.f.)
	VARIETY:	0.476 or 7.9%	(12 d.f.)
	ALDICARB x VARIETY:	0.407 or 6.7%	(12 d.f.)

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73/R/CS/125

TABLE OF MEANS

GRAIN: TONNES/HECTARE

PREVCROP

	W/W/BE/O	W/BE/O/W	BE/O/W/W	O/W/W/W	W/W/W/BE	W/W/W/W	Mean
ALDICARB							
0	5.48	6.67	5.52	5.48	6.15	3.97	5.54
5	6.47	6.58	6.47	6.48	6.67	6.60	6.55
VARIETY							
Nelson	6.06	6.64	5.57	5.50	6.56	4.81	5.86
Mostyn	5.83	6.34	5.69	5.68	6.33	5.68	5.92
W16840	6.03	6.90	6.74	6.76	6.34	5.37	6.36
Mean	5.97	6.63	6.00	5.98	6.41	5.29	6.05

ALDICARB	0			5		
VARIETY	Nelson	Mostyn	W16840	Nelson	Mostyn	W16840
PREVCROP						
W/W/BE/O	5.93	5.12	5.38	6.20	6.54	6.67
W/BE/O/W	6.29	6.95	6.77	6.98	5.74	7.03
BE/O/W/W	4.80	5.35	6.41	6.33	6.03	7.07
O/W/W/W	4.93	5.49	6.02	6.07	5.86	7.51
W/W/W/BE	6.35	6.04	6.05	6.78	6.61	6.62
W/W/W/W	3.57	4.59	3.75	6.05	6.76	6.99

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STANDARD ERRORS OF DIFFERENCES

PREVCROP	ALDICARB	VARIETY	PREVCROP ALDICARB	PREVCROP VARIETY	PREVCROP ALDICARB VARIETY
0.876	0.338	0.194	1.054	0.959	1.147

Except when comparing means with same levels of

PREVCROP	0.828	0.476	0.969
PREVCROP.ALDICARB			0.556
PREVCROP.VARIETY			0.892

Mean D.M. % 83.6

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73/R/CS/127

RIDGING, ALDICARB AND DITYLENCHUS

Object: To study the effects of ridging and aldicarb on yields of onions and incidence of Ditylenchus dipsaci (see also 73/R/CS/102) - Great Field II.

Sponsor: A.G. Whitehead.

The first year, onions.

Design: 6 randomised blocks of 2 plots split into 2.

Whole plot dimensions: 7.62 x 3.05. Sub plot area harvested: 0.00058.

Treatments: All combinations of:-

		SOWING
Whole plots: 1.	Sowing method	
	On the flat	Flat
	On ridges	Ridge
		ALDICARB
Sub plots: 2.	Aldicarb (kg)	
	None	0.0
	5.0	5.0

Basal applications: Manures: (13:13:20) at 1900 kg. Weedkillers: Propachlor ('Ramrod' at 6.7 kg), pyrazon with chlorbufam ('Alicep' at 4.5 kg in 450 l).

Seed: Robusta, fumigated with methyl bromide.

Cultivations, etc.: Ploughed: 30 Nov,1972. NPK applied: 26 Mar, 1973. Power harrowed: 27 Mar. Seed sown, aldicarb and propachlor applied: 28 Mar. Pyrazon with chlorbufam applied: 24 May. Hand weeded: 30 May, 5, 11 June and 4 July. Lifted: 3 Sept. Previous crops: Spring beans 1971, winter wheat 1972.

NOTES: (1) Soil samples were taken before applying aldicarb and after harvest for counts of Ditylenchus dispsaci.
(2) Onions were allowed to dry in the field and stored during the winter for observation of incidence of rots.

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NOTES: (3) The yields of the plots not given aldicarb were very small because of soil-borne pathogens and were therefore analysed separately from the others. The standard errors for the former have not been shown

(4) One plot treatment SOWING - Flat, ALDICARB - 0.0 was incorrectly treated. An estimated value was used in the analysis.

Standard error per sub plot. Plots given ALDICARB 5.0
Sound onions, tonnes/hectare: 2.25 or 4.6% (5 d.f.)

TABLES OF MEANS

SOUND ONIONS: TONNES/HECTARE

SOWING

	Flat	Ridge	Mean
ALDICARB			
0.0	4.0	0.8	2.4
5.0	50.5	46.5	48.5

STANDARD ERRORS OF DIFFERENCES. ALDICARB 5.0 only

SOWING

1.30

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73/S/CS/1

ROW SPACING AND SEED RATES

Object: To study the effects of seed rate and row spacing on the yields of winter wheat. The effects of different periods of pre-cropping with winter wheat are also studied - Saxmundham, Oldershaw's and Garner's plots.

Sponsors: F.V. Widdowson, A.E. Johnston.

The eighth year on this site, third year of row spacing and seed rate treatments, winter wheat.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-70/S/CS/1, 71/S/CS/1(t), 72/S/CS/1(t).

Design: A single replicate of 4 x 2 x 4 in 4 blocks of 4 plots each split lengthways into 2, plus one additional plot (not split into 2), per block. Additionally, all the plots are split breadthways into 3.

Whole plot dimensions: 5.49 x 40.2. Sub plot area harvested: 0.00293.

Treatments: All combinations of:

Whole plots: 1. Number of previous continuous wheat crops:- PREVCROP

4	4 wheats
5	5 wheats
6	6 wheats
7	7 wheats

Half plots: 2. Spacing between rows:- ROWSPACE

15 cm (6 inches)	15 cm
30 cm (12 inches)	30 cm

3. Seed rate (kg):- SEEDRATE

70	70
140	140
210	210
280	280

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Pairs of sixth plots: 4. Nitrogen fertiliser (kg N):- N

50	50
100	100
150	150

Together with one extra plot per block which had three previous continuous wheat crops and was sown at 19 cm spacing between rows at a seed rate of 210 kg. N applied to sub plots as above. 3W19R210

Basal applications: Manures: (0:20:20) at 1260 kg applied to stubble before ploughing, (20:10:10) at 310 kg broadcast at drilling. Weedkillers: Terbutryne and related triazines ('Prebane' at 4.5 kg in 340 l). Ioxynil at 0.63 kg with 1.90 kg mecoprop in 340 l. Fungicide: Tridemorph ('Calixin' at 0.7 l in 220 l).

Seed: Cappelle.

Cultivations, etc.:- Basal PK applied and ploughed in: 14 Oct, 1972. Seed sown and NPK applied: 23 Oct. 'Prebane' applied: 24 Oct. Test N applied: 16 Apr, 1973. Ioxynil and mecoprop applied: 17 Apr. Tridemorph applied: 22 May. Combine harvested: 25 Aug.

NOTE: Green crop samples were taken for estimates of total dry matter and leaf areas.

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73/S/CS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

PREVCROP

	4 wheats	5 wheats	6 wheats	7 wheats	Mean
ROWSPACE					
15 cm	5.17	4.98	5.19	5.24	5.14
30 cm	5.10	4.95	5.07	5.00	5.03
SEEDRATE					
70	5.09	4.63	5.15	5.21	5.02
140	5.26	5.11	5.23	5.16	5.19
210	5.09	5.13	5.13	5.25	5.15
280	5.11	4.98	5.02	4.87	4.99
N					
50	5.59	5.47	5.50	5.50	5.51
100	5.15	4.90	5.17	5.18	5.10
150	4.67	4.53	4.72	4.68	4.65
Mean	5.13	4.96	5.13	5.12	5.09

3W19R210

N

50	100	150	Mean
5.10	4.70	4.39	4.73

Grand mean: 5.02
Mean D.M. % 84.7

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73/R/WW/1 and 73/W/WW/1

WINTER WHEAT

VARIETIES, N AND CCC

Object: To study the effects of chlormequat (CCC) and a range of nitrogen levels on growth and yield of a selection of the newer varieties of wheat grown on land in rotation or after several cereals. Nitrogen applied at flowering is also tested and flour quality is determined - Rothamsted (R) Delafield (pathogen free) and Meadow (pathogen infected) and Woburn (W) Horsepool Lane Close (pathogen free).

Sponsors: J.R. Moffatt, R. Moffitt.

Design: 4 randomised blocks of 8 plots, split into 4, with confounding, on Delafield (R) and Horsepool Lane Close (W).
3 randomised blocks of 9 plots, split into 4 on Meadow (R).

Whole plot dimensions: 4.27 x 27.1. Sub plot area harvested: 0.00173.

Treatments: All combinations of:-

Whole plots: Varieties		VARIETY
	Atou	AT
	Bouquet	BO
	Cappelle	CA
	Champlein, Meadow (R) only	CH
	Maris Freeman	MF
	Maris Huntsman	MH
	Maris Nimrod	MN
	Maris Templar	MT
	Maris Widgeon	MW
Sub plots:	2. Nitrogen fertiliser (kg N):	N
	63 in spring	63
	126 in spring	126
	189 in spring	189
	126 in spring plus 63 at flowering	126+63
	3. Chlormequat (kg):	CCC
	None	0.0
	1.7	1.7

NOTE: The test of chlormequat was omitted on Meadow (R). On Delafield (R) and Horsepool Lane Close (W) it was applied in 427 l.

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T3/R/MW/1 and T3/W/MW/1

Basal applications:
Delafield (R), and Meadow (R): Manures: (0:20:20) at 310 kg broadcast by machine. Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l).
Horsepool Lane Close (W): Manures: (0:20:20) at 300 kg combine drilled. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l.

Seed: Delafield (R) and Meadow (R): Varieties sown at 200 kg.
Horsepool Lane Close (W): Varieties sown at 190 kg.

Cultivations, etc.:-
Delafield (R): Deep-tine cultivated twice, PK applied, seed sown: 27 Oct, 1972. N applied : 6 Apr, 1973. Weedkiller applied: 18 Apr. CCC applied: 30 May. Late N applied: 12 June. Combine harvested: 23 Aug. Previous crops: Fallow 1971, potatoes 1972.
Meadow (R): Deep-tine cultivated: 6 Oct, 1972. Rotary harrowed: 25 Oct. PK applied, seed sown: 27 Oct. N applied: 5 Apr, 1973. Weedkiller applied: 16 Apr. Late N applied: 12 June. Combine harvested: 24 Aug. Previous crops: Barley 1971, 1972.
Horsepool Lane Close (W): Deep-tine cultivated: 17 Oct, 1972. PK applied, seed sown: 24 Oct. Weedkiller applied: 13 Apr, 1973. N applied: 17 Apr. CCC applied: 31 May. Late N applied: 13 June. Combine harvested: 17 Aug. Previous crops: Fallow 1971, potatoes 1972.

Standard errors per plot. Grain, tonnes/hectare:

Delafield (R):	Whole plot:	0.280 or 4.0% (13 d.f.)
	Sub plot:	0.603 or 8.5% (48 d.f.)
Meadow (R):	Whole plot:	0.398 or 7.8% (16 d.f.)
	Sub plot:	0.592 or 11.6% (54 d.f.)
Horsepool Lane Close (W):	Whole plot:	0.463 or 7.3% (13 d.f.)
	Sub plot:	0.510 or 8.0% (48 d.f.)

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73/R/WW/1 and 73/W/WW/1

TABLE OF MEANS

DELAFIELD (R): PATHOGEN FREE

GRAIN: TONNES/HECTARE

VARIETY

	AT	BO	CA	MT	MH	MI	MT	MW	Mean
N									
63	7.62	6.99	6.93	7.27	8.41	8.35	8.55	6.75	7.61
126	7.32	6.29	5.24	7.38	8.75	7.92	8.35	6.09	7.17
189	6.09	5.17	4.83	6.24	7.97	6.47	7.65	4.91	6.17
126+63	7.57	6.46	6.05	7.03	8.42	8.47	8.62	5.59	7.28
CCC									
0.0	7.02	6.11	5.37	6.59	8.00	7.59	8.28	5.29	6.77
1.7	7.28	6.34	6.15	7.37	8.78	8.02	8.30	6.47	7.34
Mean	7.15	6.23	5.76	6.98	8.39	7.80	8.29	5.84	7.06

N

	63	126	189	126+63
CCC				
0.0	7.54	6.87	5.84	6.84
1.7	7.68	7.47	6.49	7.72

STANDARD ERRORS OF DIFFERENCES

VARIETY	N	CCC	VARIETY N	VARIETY CCC	N CCC
0.198	0.151	0.107	0.419	0.291	0.213

Except when comparing means with same level of

VARIETY		0.426	0.302	
N				0.210
CCC				0.210

Mean D.M. % 85.7

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73/R/WW/1 and 73/W/WW/1

MEADOW (R)

GRAIN: TONNES/HECTARE

VARIETY

N	AT	BO	CA	CH	MF	MH	MN	MT	MW	Mean
63	4.91	4.58	4.76	5.95	4.99	5.39	6.94	5.31	5.02	5.32
126	4.88	4.57	4.44	5.66	4.72	5.15	5.55	5.37	4.08	4.94
189	5.00	3.92	4.79	5.86	4.51	5.51	5.91	6.12	3.85	5.05
126+63	5.57	5.19	4.73	5.74	4.96	4.87	5.55	5.51	4.08	5.13
Mean	5.09	4.56	4.68	5.80	4.79	5.23	5.99	5.58	4.26	5.11

STANDARD ERRORS OF DIFFERENCES

VARIETY	N	VARIETY N
0.325	0.161	0.530

Except when comparing means with same level of VARIETY 0.483

Mean D.M. % 87.6

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73/R/WW/1 and 73/W/WW/1

HORSEPOOL LANE CLOSE (W)

GRAIN: TONNES/HECTARE

VARIETY

	AT	BO	CA	MF	MH	MN	MT	MW	Mean
N									
63	6.49	6.04	6.24	6.29	7.37	7.40	6.82	6.05	6.59
126	6.46	6.24	5.25	6.51	7.48	7.06	7.05	5.77	6.48
189	5.97	5.70	4.92	5.65	7.55	6.63	6.92	5.05	6.05
126+63	6.37	6.50	5.18	5.89	7.43	7.04	7.38	5.14	6.37
CCC									
0.0	6.28	6.31	5.14	6.20	7.48	7.08	7.17	5.04	6.34
1.7	6.37	5.93	5.65	5.97	7.43	6.98	6.91	5.97	6.40
Mean	6.32	6.12	5.40	6.08	7.46	7.03	7.04	5.50	6.37

N

	63	126	189	126+63
CCC				
0.0	6.62	6.48	6.03	6.23
1.7	6.56	6.48	6.07	6.50

STANDARD ERRORS OF DIFFERENCES

VARIETY	N	CCC	VARIETY N	VARIETY CCC	N CCC
0.328	0.127	0.090	0.453	0.374	0.180

Except when comparing means with same level of

VARIETY		0.360	0.255	
N				0.226
CCC				0.226

Mean D.M. % 84.4

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73/R/WW/2 and 73/BB/WW/2

WINTER WHEAT

GROWTH AND YIELD ON CONTRASTED SITES

Object: To try to account for yields and differences between yields of wheat on sites at Rothamsted and Broom's Barn by studying crop growth rates, nutrient uptake, water use etc., at a wide range of nitrogen levels, with and without irrigation. Also to study the interaction between site differences and crops (see also 73/R/BS/1 and BB/BS/1). Rothamsted (R) - Great Knott III, and Broom's Barn (BB) - New Piece.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: 3 randomised blocks of 2 plots, split into 6.

Whole plot dimensions:
Great Knott III (R): 15.2 x 48.0. Sub plot area harvested: 0.00434.
New Piece (BB): 15.2 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-

Whole plots: 1. Irrigation:		IRRIGN
	None	0
	Full irrigation	I
Sub plots: 2. Nitrogen fertiliser (kg N):		N
	31	31
	63	63
	94	94
	125	125
	157	157
	188	188

Total irrigation was 50.8 mm applied on 2 occasions (R) and 110.5 mm applied on 4 occasions (BB).

Basal applications (both fields): Manures: (0:20:20) at 1300 kg and Epsom salts at 900 kg worked into seedbed. (10:24:24) at 250 kg combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 220 l (R) and 'Banlene Plus' at 5.6 l in 220 l (BB)). Fungicide: Tridemorph at 0.53 kg in 220 l.

Seed: Cappelle, dressed with dieldrin, sown at 200 kg.

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73/R/WW/2 and 73/BB/WW/2

Cultivations, etc.:-

Great Knott III (R): Basal PK and Epsom salts applied: 13 Oct, 1972. Deep-tine cultivated: 16 Oct. Rotary cultivated: 17 Oct. Seed sown: 20 Oct. N applied: 13 Apr, 1973. Weedkiller applied: 26 Apr. Fungicide applied: 18 May. Irrigated 14 and 18 June. Combine harvested: 22 Aug. Previous crops: Barley 1971, beans 1972.

New Piece (BB): Deep-tine cultivated: 28 Sept and 2 Oct, 1972. Basal PK and Epsom salts applied: 6 Oct. Seed sown: 10 Oct. N applied: 12 Apr, 1973. Weedkiller applied: 16 Apr. Fungicide applied: 15 May. Irrigated: 8, 14, 15 June and 5 July. Combine harvested: 16 Aug. Previous crops: Sugar beet 1971, beans 1972.

NOTE: Crop samples were taken throughout the season. The percentage of N, P and K was measured in all samples. The number of tillers or ear-bearing stems was counted, and the leaf areas measured at each sampling. Mildew (Erysiphe graminis) assessments were made. 1000 grain weights were determined. Soil moisture content was estimated by neutron probe weekly.

Standard errors per sub plot. Grain, tonnes/hectare:

Great Knott III (R):	0.260 or 4.1% (20 d.f.)
New Piece (BB):	0.288 or 5.1% (20 d.f.)

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73/R/WW/2 and 73/BB/WW/2

TABLES OF MEANS

GREAT KNOTT III (R)

GRAIN: TONNES/HECTARE

N

	31	63	94	125	157	188	Mean
IRRIGN							
0	7.47	6.61	6.27	6.56	6.07	6.31	6.55
I	6.88	6.23	5.96	5.72	5.63	5.52	5.99
Mean	7.18	6.42	6.12	6.14	5.85	5.91	6.27

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN* N
	0.150	
*Within the same level of IRRIGN only		0.207

STRAW: TONNES/HECTARE

0	7.25	8.19	8.31	8.38	8.15	8.17	8.07
I	6.03	8.15	8.75	7.68	8.13	7.78	7.75
Mean	6.64	8.17	8.53	8.03	8.14	7.97	7.91

Mean D.M. % Grain 82.5
Straw 83.4

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73/R/WW/2 and 73/BB/WW/2

NEW PIECE (BB)

GRAIN: TONNES/HECTARE

	N 31	63	94	125	157	188	Mean
IRRIGN							
0	5.19	5.73	5.87	5.86	5.40	5.45	5.59
I	5.15	5.86	6.03	5.86	5.73	5.43	5.68
Mean	5.17	5.80	5.95	5.86	5.57	5.44	5.63

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN* N
	0.166	
*Within the same level of IRRIGN only		0.235

STRAW: TONNES/HECTARE

0	6.10	6.27	6.75	6.96	6.78	7.25	6.69
I	6.48	6.80	7.17	7.12	7.03	7.36	6.99
Mean	6.29	6.53	6.96	7.04	6.91	7.30	6.84

Mean D.M. % Grain 87.5
Straw 67.8

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73/R/WW/3

WINTER WHEAT

WEEDKILLER, AQUEOUS N AND FUNGICIDE

Object: To study the effects of combined sprays of liquid nitrogen fertiliser, hormone weedkiller and fungicide on foliar scorch and yield of winter wheat - Great Knott III.

Sponsors: S.C.R. Freeman, A. Penny.

Design: 4 randomised blocks of 20 plots.

Whole plot dimensions: 2.13 x 2.74. Area harvested: 0.00038.

Treatments: All combinations of:-

1. Form of nitrogen	FORM
Solid, as 'Nitro-Chalk' 21% N	Solid
Liquid, as urea/ammonium nitrate 26% N	Liquid
2. Rate of nitrogen (kg N)	N
56	56
112	112
3. Weedkiller (dichlorprop/MCPA, kg total a.e.)	WEEDKLLR
None	0.0
2.8	2.8
4. Fungicide (tridemorph, kg)	FUNGCIDE
None	0.00
0.53	0.53

together with EXTRA-certain of the above combinations, all with a wetter ('Nonidet' at 1 part in 1600):-

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73/R/WW/3

1. Liquid nitrogen rate (kg N)	LIQUIDNW
56	56
112	112

2. Weedkiller (dichlorprop/MCPA, kg total a.e.)	WEEDKLLR
None	0.0
2.8	2.8

NOTE: **Combinations with liquid nitrogen at 56 kg N were all applied in 170 l. All other combinations were applied in 340 l except tridemorph applied alone, in 170 l.**

Basal applications: Manures: (0:20:20) at 1300 kg plus magnesium sulphate at 900 kg worked into seedbed. (10:24:24) at 250 kg combine drilled.

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.:- PK and Mg applied: 13 Oct, 1972. Deep-tine cultivated: 16 Oct. Rotary harrowed: 17 Oct. Seed sown: 19 Oct. Treatments applied: 1 May, 1973. Cut by hand: 20 Aug. Previous crops: Barley 1971, beans 1972.

NOTE: Grain samples were taken for determination of N content. Estimates were made of infection by mildew (Erysiphe graminis) and Septoria nodorum on 10 July.

Standard error per plot.
Grain, tonnes/hectare: 0.670 or 13.2% (57 d.f.)

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73/R/WW/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N		WEEDKLLR		FUNGCIDE		
	56	112	0.0	2.8	0.00	0.53	Mean
FORM							
Solid	5.56	4.32	5.11	4.78	4.99	4.90	4.94
Liquid	5.52	4.94	5.20	5.26	5.05	5.41	5.23
N							
56			5.50	5.58	5.51	5.58	5.54
112			4.81	4.45	4.53	4.73	4.63
WEEDKLLR							
0.0					4.97	5.34	5.15
2.8					5.07	4.97	5.02
Mean					5.02	5.16	5.09

EXTRA

WEEDKLLR

	0.0	2.8	Mean
LIQUIDWW			
56	5.64	5.78	5.71
112	4.49	4.39	4.44
Mean	5.07	5.08	5.08

Grand mean 5.08

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STANDARD ERRORS OF DIFFERENCES

Excluding EXTRA

All marginal means	0.167
All 2-way tables	0.237

EXTRA

All marginal means	0.335
2-way table	0.474

Mean D.M. % 84.8

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73/R/WW/4

WINTER WHEAT

SEPTORIA

Object: To study the effects of different amounts of artificially and naturally infected straw and artificially infected seed on the development of Septoria and its effects on yield - Great Knott I.

Sponsors: J.F. Jenkyn, J. King (MAFF).

Design: 6 x 6 Latin square.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00260.

Treatments: Infection with Septoria	SEPTORIA
None	0
Straws, artificially infected, worked into seedbed (8 cm pieces, thousands per hectare):-	
143	ART1
765	ART2
2470	ART3
Straws, naturally infected, worked into seedbed (8 cm pieces, thousands per hectare):-	
2470	NAT3
Seed artificially infected	SEED

Basal applications: Manures: 310 kg (0:20:20) combine drilled, 380 kg 'Nitro-Chalk' in spring. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' 7.0 l in 220 l).

Seed: Cappelle, dressed with dieldrin, sown at 200 kg.

Cultivations, etc.:- Deep-tine cultivated twice, inoculum applied and power harrowed: 24 Oct, 1972. Seed combine drilled: 25 Oct. N applied: 13 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 22 Aug. Previous crops: Fallow 1971, potatoes 1972.

NOTE: Septoria nodorum was assessed soon after seedling emergence and after ear emergence.

Standard error per plot.
Grain, tonnes/hectare: 0.421 or 6.7% (20 d.f.)

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73/R/WW/4

TABLES OF MEANS

GRAIN: TONNES/HECTARE

SEPTORIA

0	ART1	ART2	ART3	NAT3	SEED	Mean
6.10	6.55	6.18	6.35	6.14	6.36	6.28

STANDARD ERROR OF DIFFERENCES

SEPTORIA

0.243

Mean D.M. % 84.7

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73/R/WW/8

WINTER WHEAT

PESTICIDES AND PEST PREDATORS

Object: To study the effects of commonly used soil pesticides on predatory arthropods and to determine effects on yield - Road Piece.

Sponsor: C.A. Edwards.

Design: 4 blocks of 6 plots.

Whole plot dimensions: 4.27 x 6.10.

Treatments: Chemicals (kg):-

	CHEMICAL
None	0
Benomyl 4.5	BE
Endrin 3.6	ER
Endosulfan 0.08	ES
Tetradifon 2.2	TE
Phorate 3.6	PH

Treatments were applied on 2 Oct, 1972, tetradifon and phorate as granules, the other three in solution and all harrowed in.

Basal applications: Manures: (0:14:28) at 380 kg combine drilled. 'Nitro-Chalk' at 350 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 220 l).

Seed: Cappelle, dressed with fungicide only, sown at 200 kg.

Cultivations, etc.:- Ploughed: 21 Sept, 1972. Power harrowed: 2 Oct. Seed sown: 12 Oct. N applied: 18 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 23 Aug. Previous crops: Grass 1971 and 1972.

NOTES: (1) Soil cores for the estimation of soil fauna were taken on 7 Mar, 9 Apr, 29 May, 13 July and 20 Aug. Numbers of earthworms were estimated on 16 May.
(2) Yields were not taken because of severe damage by birds.

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73/R/WS/1

SPRING WHEAT

N LEVELS AND PHYSIOLOGY

Object: To study the physiological basis of the response of spring wheat to a wide range of nitrogen levels - Long Hoos V.

Sponsor: G.N. Thorne.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 2.41 x 14.9. Area harvested: 0.00106.

Treatments: All combinations of:-

1. Nitrogen fertiliser (kg N):

	N
None	0
25	25
50	50
75	75
100	100
125	125
150	150
175	175
200	200

2. Seed rates (kg):

	SEEDRATE
132	132
244	244

Basal applications: Manures: (0:20:20) at 780 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 290 l). Fungicides: Ethirimol at 0.35 kg in 290 l on four occasions, oxycarboxin at 1.5 kg in 290 l on one occasion, and 'BAS 3170F' at 2.2 kg in 290 l on one occasion.

Seed: Kleiber.

Cultivations, etc.:- Ploughed: 12 Nov, 1972. Basal PK applied: 29 Nov. Power harrowed and seed sown: 13 Mar, 1973. N treatments applied: 10 Apr. Weedkiller applied: 18 May. Fungicides applied:

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Ethirimol: 18 May, 1, 18 June, 10 July. Oxycarboxin: 9 July, 'BAS 3170F': 24 July. Combine harvested: 24 Aug. Previous crops: Barley 1971, French beans 1972.

NOTE: Plant counts were made after germination and shoot counts on nine occasions during the season. Dry weight and leaf area were determined on six occasions between 22 June and 23 August. Soil moisture was measured in May, June and August. Light penetration into the canopy was measured twice in July. In June and July rates of photosynthesis of leaves were measured on twelve occasions and translocation twice.

Standard error per plot.
Grain, tonnes/hectare: 0.465 or 7.9% (17 d.f.)

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73/R/WS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N									
	0	25	50	75	100	125	150	175	200	Mean
SEEDRATE										
132	5.56	6.04	6.42	6.06	6.37	5.47	6.15	5.32	5.69	5.90
244	5.91	5.92	6.16	6.19	5.96	5.65	6.16	5.66	5.14	5.86
Mean	5.74	5.98	6.29	6.12	6.17	5.56	6.16	5.49	5.42	5.88

STANDARD ERRORS OF DIFFERENCES

SEEDRATE	N	SEEDRATE N
0.155	0.329	0.465

Mean D.M. % 84.1

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73/R/BW/1

WINTER BARLEY

TIMES OF APPLYING FUNGICIDES

Object: To study the effects of fungicides applied to barley at specific stages of mildew development on subsequent infection and on yield - Hoosfield.

Sponsor: A. Bainbridge.

Design: 5 x 5 Latin square.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00195.

Treatments: Times of applying fungicides	FUNGCIDE
None	0
Seed dressed with ethirimol	ED
Sprayed with tridemorph at 0.7 l in 340 l	
at GS 2-3 (beginning of tillering) on 19 Mar	TS1
at GS 8 (last leaf just visible) on 18 May (when spore numbers in traps were increasing rapidly)	TS2
at GS 10.5 (all ears out of sheath) on 31 May	TS3

Basal applications: Manures: 310 kg (0:20:20) combine drilled. 380 kg 'Nitro-Chalk' in spring. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 220 l).

Seed: Senta sown at 160 kg.

Cultivations, etc.:- Ploughed: 11 Sept, 1972. Disced twice: 18 Sept. Rotary harrowed: 28 Sept. Seed sown: 29 Sept. N applied: 14 Apr, 1973. Weedkiller applied: 26 Apr. Combine harvested: 26 July. Previous crops: Barley 1971, barley 1972.

NOTE: Determinations were made of numbers of seedlings at emergence, amounts of foliar disease and the number of fertile tillers.

Standard error per plot.
Grain, tonnes/hectare: 0.237 or 4.1% (12 d.f.)

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73/R/EW/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGCIDE

0	ED	TS1	TS2	TS3	Mean
5.56	5.94	5.45	6.06	5.84	5.77

STANDARD ERROR OF DIFFERENCES

FUNGCIDE

0.150

Mean D.M. % 83.3

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73/R/BS/1 and 73/BB/BS/1

SPRING BARLEY

GROWTH AND YIELD ON CONTRASTED SITES

Object: To try to account for yields and differences between yields of barley on sites at Rothamsted and Broom's Barn by studying crop growth rates, nutrient uptake, water use etc., at a wide range of nitrogen levels, with and without irrigation. Also to study the interaction between site differences and crops (see also 73/R and BB/WW/2) - Rothamsted (R), Long Hoos I and II, and Broom's Barn (BB), Dunholme Field.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: 3 randomised blocks of 2 plots, split into 6.

Whole plot dimensions:
Long Hoos I and II (R): 15.2 x 48.0. Sub plot area harvested: 0.00434.
Dunholme Field (BB): 15.2 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-

Whole plots: 1. Irrigation:		IRRIGN
	None	0
	Full irrigation	I
Sub plots: 2. Nitrogen fertiliser (kg N):		N
	31	31
	63	63
	94	94
	125	125
	157	157
	188	188

Total irrigation was 50.8 mm applied on 2 occasions (R) and 111.8 mm applied on 4 occasions (BB).

Basal applications:
Long Hoos (R): Manures: (0:20:20) at 360 kg combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' at 7.0 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 220 l.
NOTE: The site had a basal dressing of (0:20:20) at 1300 kg and Epsom salts at 900 kg in autumn 1971.
Dunholme Field (BB): Manures: (0:20:20) at 1300 kg. Epsom salts at 900 kg in autumn. (0:20:20) at 380 kg combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l). Fungicide: Tridemorph 0.53 kg in 220 l.

Seed: Julia, dressed with ethirimol, sown at 160 kg (R) and 180 kg (BB).

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73/R/BS/1 and 73/BB/BS/1

Cultivations, etc.:-

Long Hoos (R): Ploughed: 9 Nov, 1972. N applied, springtine cultivated and seed sown: 9 Mar, 1973. Weedkiller and fungicide applied: 11 May. Irrigated: 14 and 18 June. Combine harvested: 10 Aug. Previous crops: Beans 1971, winter wheat 1972.

Dunholme Field (BB): Basal PK and Epsom salts applied: 6 Oct, 1972. Ploughed: 10 Nov. N applied: 8 Mar, 1973. Seed sown: 12 Mar. Weedkiller and fungicide applied: 14 May. Irrigated: 8, 14, 15 June and 5 July. Combine harvested: 9 Aug. Previous crops: Sugar beet 1971, winter wheat 1972.

NOTE: Crop samples were taken throughout the season. The percentage of N, P and K was measured in all samples. The number of tillers or ear-bearing stems was counted, and the leaf areas measured at each sampling. Mildew (Erysiphe graminis) assessments were made. 1000 grain weights were determined. Soil moisture content was estimated by neutron probe weekly.

Standard errors per sub plot.	Grain: tonnes/hectare.
Long Hoos I and II (R):	0.318 or 5.7% (20 d.f.)
Dunholme Field (BB):	0.221 or 3.9% (20 d.f.)

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73/R/BS/1 and 73/BB/BS/1

TABLES OF MEANS

LONG HOOS I AND II (R)

GRAIN: TONNES/HECTARE

	N						
	31	63	94	125	157	188	Mean
IRRIGN							
0	4.39	5.28	5.96	6.06	6.11	5.97	5.63
I	4.51	5.44	5.92	5.76	5.93	6.07	5.61
Mean	4.45	5.36	5.94	5.91	6.02	6.02	5.62

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN* N
	0.184	
* Within the same level of IRRIGN only		0.260

Mean D.M. % 84.8

STRAW: TONNES/HECTARE

IRRIGN							
0	1.94	2.97	4.25	4.77	5.05	5.10	4.01
I	2.65	3.28	4.15	5.15	4.94	5.28	4.24
Mean	2.30	3.12	4.20	4.96	5.00	5.19	4.13

Mean D.M. % 95.1

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73/R/BS/1 and 73/BB/BS/1

DUNHOLME FIELD (BB)

GRAIN: TONNES/HECTARE

	N						
	31	63	94	125	157	188	Mean
IRRIGN							
0	5.89	6.01	5.24	5.20	5.43	5.39	5.52
I	5.86	6.10	5.79	5.81	5.77	5.97	5.88
Mean	5.87	6.05	5.51	5.50	5.60	5.68	5.70

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN* N
	0.128	
* Within the same level of IRRIGN only		0.185

Mean D.M. % 81.4

STRAW: TONNES/HECTARE

IRRIGN							
0	4.39	4.61	4.99	4.92	4.79	4.73	4.74
I	4.71	6.02	6.18	5.76	6.06	5.73	5.74
Mean	4.55	5.32	5.59	5.34	5.43	5.23	5.24

Mean D.M. % 64.4

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T3/R/1G/2 AND T3/W/2G/2

SPRING BARLEY

VARIETIES AND N

Object: To study the yield of newer varieties of barley grown at a range of nitrogen levels - Rothamsted (R) Gt Harpenden II and Woburn (W) Horsepool Lane Close.

Sponsors: J.R. Moffatt, J.F. Jenkyn.

Design: 4 blocks of 11 plots, split into 3.

Whole plot dimensions: 4.27 x 24.7. Sub plot area harvested: Gt Harpenden II (R): 0.00163. Horsepool Lane Close (W): 0.00217.

Treatments: All combinations of:-

Whole plots: 1. Varieties and Mildew control	VARIETY
Berac, sprayed tridemorph	BE-T
Gerkra, sprayed tridemorph	GE-T
Hassan, sprayed tridemorph	HA-T
Julia, no mildew control	JU-C
Julia, seed dressed ethirimol	JU-E
Julia, sprayed tridemorph	JU-T
Lofa Abed, sprayed tridemorph	LA-T
Mazurka, sprayed tridemorph	MA-T
Maris Mink, sprayed tridemorph	MM-T
Universe, sprayed tridemorph	UN-T
Vada, sprayed tridemorph	VA-T

Tridemorph applied at 0.53 kg in 370 l.

Sub plots: 2. Nitrogen fertiliser (kg N)	N
38	38
75	75
113	113

Basal applications:

Gt Harpenden II (R): Manures: 310 kg (0:20:20) combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 220 l).

Horsepool Lane Close (W): Manures: Magnesian limestone at 7.5 tonnes, 310 kg (0:20:20) combine drilled: Weedkiller: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l.

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73/R/BS/2 AND 73/W/BS/2

Seed: Gt Harpenden II (R) and Horsepool Lane Close (W): Varieties sown at 160 kg.

Cultivations, etc.:-

Gt Harpenden II (R): Ploughed: 24 Nov, 1972. Seed sown: 16 Mar, 1973. N applied: 23 Mar. Weedkiller applied: 15 May. Tridemorph applied: 1 June. Combine harvested: 11 Aug. Previous crops: Spring beans 1971, barley 1972.

Horsepool Lane Close (W): Deep-tine cultivated: 1 Sept, 1972. Magnesian limestone applied: 18 Sept. Deep-tine cultivated: 26 Sept. Ploughed: 1 Jan, 1973. Power harrowed seed sown: 14 Mar. N applied: 19 Mar. Weedkiller applied: 11 May. Tridemorph applied: 1 June. Combine harvested: 10 Aug. Previous crops: Fallow 1971, barley 1972.

NOTE: Gt Harpenden II (R). Some of the grain was lost from one plot - treatment BE-T, N 38. **An estimated value was used in the analysis.**

Standard errors per plot. Grain: tonnes/hectare:

Gt Harpenden II (R):	Whole plot:	0.207 or 3.3%	(30 d.f.)
	Sub plot:	0.221 or 3.6%	(65 d.f.)
Horsepool (W):	Whole plot:	0.451 or 8.8%	(30 d.f.)
	Sub plot:	0.638 or 12.5%	(66 d.f.)

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T3/R/BS/2 AND T3/M/BS/2

TABLES OF MEANS

CROP: TONNES/HECTARE

GT HARPENDEN II (R)

VARIETY

N	BE-T	GE-T	MA-T	JU-O	JU-E	JU-T	LA-T	MA-E	MI-T	UN-T	VA-E	Mean
38	6.41	5.96	6.65	5.51	6.16	6.31	5.77	5.83	7.58	7.66	5.73	6.33
75	6.51	5.95	6.68	5.25	6.06	6.19	5.46	5.89	7.61	7.41	5.89	6.27
113	6.13	5.67	6.20	5.12	6.03	6.19	5.39	5.71	6.97	6.95	6.08	6.04
Mean	6.35	5.86	6.51	5.29	6.09	6.23	5.54	5.81	7.39	7.35	5.90	6.21

STANDARD ERRORS OF DIFFERENCES

N	VARIETY	N VARIETY
0.047	0.147	0.194

Except when comparing means with same level of **VARIETY:** 0.156

Mean D.M. % 79.0

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73/R/BS/2 AND 73/W/BS/2

GRAIN: TONNES/HECTARE

HORSEPOOL LANE CLOSE (W)

VARIETY

N	BE-T	GE-T	HA-T	JU-C	JU-E	JU-T	LA-T	MA-T	MM-T	UM-T	VA-T	Mean
38	4.73	5.03	5.20	4.36	4.79	5.19	4.59	4.94	5.27	3.74	4.82	4.79
75	5.09	5.00	5.00	4.49	5.22	5.33	5.28	5.21	5.12	5.30	5.29	5.12
113	5.35	5.52	5.30	4.71	5.48	5.79	5.14	5.67	5.33	5.85	5.42	5.41
Mean	5.06	5.18	5.16	4.52	5.16	5.44	5.00	5.27	5.24	4.96	5.17	5.11

STANDARD ERRORS OF DIFFERENCES

N	VARIETY	N VARIETY
0.136	0.319	0.488

Except when comparing means with same level of **VARIETY:** 0.451

Mean D.M. % 83.0

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73/R/BS/3

SPRING BARLEY

SYSTEMIC FUNGICIDE STUDY

Object: To study the effectiveness of different methyl benzimidazol-2-ylcarbamic acid (MBC) precursors and to relate chemical measurements of persistence, movement and conversion to MBC to field performance - Great Harpenden II.

Sponsors: I.J. Graham-Bryce, I.H. Williams.

Design: 6 randomised blocks of 4 plots.

Whole plot dimensions: 2.41 x 9.14. Area harvested: 0.00151.

Treatments: Fungicidal seed dressings:

	FUNGCIDE
None	0
Benomyl	B
NF 48	N
Thiophanate methyl	T

All treatments applied at 0.9 kg/126 kg seed.

Basal applications: Manures: 440 kg (20:15:15) combine drilled. Weed-killer: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 220 l).

Seed: Sultan (smut infected seed, not dressed apart from treatments) sown at 160 kg.

Cultivations, etc.: Deep-tine cultivated: 25 Aug, 1972. Ploughed: 24 Nov. Seed sown: 17 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 11 Aug. Previous crops: Beans 1971, barley 1972.

NOTE: Plant and soil samples were taken for residue analyses of the three fungicides. Counts of mildew were made three times and of smut once.

Standard error per plot.
Grain, tonnes/hectare: 0.262 or 4.9% (15 d.f.)

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73/R/BS/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGCIDE

0	B	N	T	Mean
4.88	5.57	5.71	5.34	5.37

STANDARD ERROR OF DIFFERENCES

FUNGCIDE

0.152

Mean D.M. % 86.1

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73/R/BS/5

SPRING BARLEY

DISTANCE AND MILDEW SPREAD

Object: To study the effects of fungicidal sprays, applied to barley at different times on yield and incidence of mildew. The effects of separating plots either by a mildew-infected or mildew-free crop are also studied - Whitlocks.

Sponsors: J.F. Jenkyn, A. Bainbridge.

Design: Two 4 x 4 Latin squares one for each DISTANCE.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00195.

Treatments: All combinations of:-

1. Distance apart of plots: DISTANCE

Close together (4.3 m)	Close
Far apart (22.9 m)	Far

2. Fungicidal sprays: FUNGCIDE

None	0
Tridemorph spray when spore production began to increase rapidly (1 June)	T1
Tridemorph spray 10-14 days after T1 (11 June)	T2
Tridemorph spray 10-14 days after T2 (25 June)	T3

NOTES: (1) Tridemorph was applied at 0.53 kg in 290 l.
(2) Plots of 'Close' and 'Far' were sown with Zephyr, seed not dressed with ethirimol. Surrounds of 'Close' plots were sown with the same seed but surrounds of 'Far' plots were sown with Mazurka dressed with ethirimol.
(3) All 'Far' plots had adjacent plots sown with Mazurka, dressed with ethirimol, for covariance analysis.

Basal applications: Manures: 440 kg (20:15:15) combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' 7.0 l in 220 l).

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Seed: Sown at 160 kg.

Cultivations, etc.:- Ploughed: 20 Nov, 1972. Seed sown: 19 Mar, 1973. Weedkiller applied: 10 May. Combine harvested: 14 Aug. Previous crops: Potatoes 1971, winter wheat 1972.

NOTE: Counts were made of seedling emergence and fertile tillers. Amounts of mildew and green leaf were assessed at approximately weekly intervals from end of May.

Standard errors per plot. Grain, tonnes/hectare.

Close **DISTANCE:**	0.163 or 3.4%	(6 d.f.)
Far **DISTANCE:**	0.091 or 1.9%	(6 d.f.)
Pooled within DISTANCES:	0.132 or 2.8%	(12 d.f.)

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73/R/BS/5

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGCIDE

	0	T1	T2	T3	Mean
DISTANCE					
Close	4.40	5.35	4.80	4.49	4.76
Far	4.41	5.29	4.86	4.47	4.76
Far-Close	+0.01	-0.06	+0.06	-0.02	0.00

STANDARD ERRORS OF DIFFERENCES

DISTANCE	FUNGCIDE DISTANCE	DISTANCE*
Close	Far	Far-Close
0.115	0.065	0.044

* For use only in the comparison of two differences.

Mean D.M. % 88.3

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73/R/BS/6

SPRING BARLEY

TIMES OF APPLYING FUNGICIDES

Object: To study the effects of applying fungicides to barley, at a range of times on yield and incidence of mildew - Whittlocks.

Sponsor: J.F. Jenkyn.

Design: 4 blocks of 14 plots.

Whole plot dimensions: 4.27 x 12.2 Area harvested: 0.00260.

Treatments: Times of applying fungicides:	FUNGCIDE
None (2 plots per block)	0
Ethirimol seed dressing (2 plots per block)	ED
Ethirimol spray, early (1 June)	ES1
Ethirimol spray, late (25 June)	ES2
Tridemorph spray, early (2 plots per block) (1 June)	TS1
Tridemorph spray, late (25 June)	TS2
Tridemorph spray, 10-14 days after rapid increase in mildew spore production (11 June)	TS3
Captafol plus tridemorph sprays repeated 3 times (1,11,25 June)	CTS
Ethirimol seed dressing plus tridemorph spray, early (1 June)	EDTS1
Ethirimol seed dressing plus tridemorph spray, late (25 June)	EDTS2
Tridemorph spray, early plus late (1,25 June)	TS12

NOTE: Tridemorph was applied at 0.64 kg in 290 l
Ethirimol was applied at 0.44 kg in 290 l
Captafol was applied at 1.7 kg in 290 l.

Basal applications: Manures: (20:15:15) at 440 kg, combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' 7.0 l in 220 l).

Seed: Zephyr, sown at 160 kg.

Cultivations, etc.:- Ploughed: 20 Nov, 1972. Seed sown: 20 Mar, 1973. Weedkiller applied: 18 May. Combine harvested: 14 Aug. Previous crops: Potatoes 1970, winter wheat 1971.

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NOTE: Counts were made of seedling emergence and fertile tillers.
Brown rust (Puccinia hordei) was assessed in mid July.
Mildew and % green leaf were assessed at intervals from May onwards.

Standard error per plot.
Grain, tonnes/hectare: 0.194 or 4.0% (42 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGCIDE

O	ED	ES1	ES2	TS1	TS2	TS3	CTS	EDTS1	EDTS2	TS12	Mean
4.34	4.88	4.91	4.45	5.23	4.50	4.83	5.55	5.25	4.92	5.21	4.89

STANDARD ERRORS OF DIFFERENCES

FUNGCIDE

Between O, ED and TS1	0.097
Between remainder	0.138
Between any of O, ED, TS1 and any of remainder	0.119

Mean D.M. % 87.9

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73/R/BS/7

SPRING BARLEY

CONTROL OF CEREAL APHIDS AND BYDV

Object: To study the effects of controlling cereal aphids on the incidence of barley yellow dwarf virus (BYDV) and on yield of barley - Summerdells II.

Sponsor: R.T. Plumb.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 24.4. Area harvested: 0.00390.

Treatments: All combinations of:-

1. Phorate as granules to seedbed (kg a.i.) PHORATE

None	0.0
2.5	2.5
5.0	5.0

2. Menazon spray in early June (1 'Saphi-Col') MENAZON (1)

None	0.0
0.7	0.7

3. Menazon spray in early July (1 'Saphi-Col') MENAZON (2)

None	0.0
0.7	0.7

NOTE: Phorate was applied as 10% granules and menazon in 370 l.

Basal applications: Manures: 440 kg (20:15:15) combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' 5.6 l in 220 l).

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated twice: 1 Dec, 1972. Phorate granules distributed and all plots spring-tine cultivated: 16 Mar, 1973. Seed sown: 17 Mar. Weedkiller applied: 15 May. Menazon treatments applied: 8 June and 9 July. Combine harvested: 13 Aug. Previous crops: Barley 1971, beans 1972.

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NOTE: Counts of plants with virus symptoms, of numbers and species of aphids and percentage parasitised were made at intervals throughout the season. 1000 grain weights were determined.

Standard error per plot.
Grain, tonnes/hectare: 0.175 or 2.8% (33 d.f.)

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TABLES OF MEANS

GRAIN: TONNES/HECTARE

	MENAZON (1) 0.0	MENAZON (1) 0.7	MENAZON (2) 0.0	MENAZON (2) 0.7	Mean
PHORATE					
0.0	6.26	6.20	6.23	6.23	6.23
2.5	6.26	6.44	6.41	6.29	6.35
5.0	6.36	6.31	6.40	6.27	6.33
MENAZON (1)					
0.0			6.36	6.23	6.29
0.7			6.34	6.30	6.32
Mean			6.35	6.26	6.30

MENAZON (1)	0.0		0.7	
MENAZON (2)	0.0	0.7	0.0	0.7
PHORATE				
0.0	6.34	6.17	6.12	6.28
2.5	6.30	6.23	6.51	6.36
5.0	6.43	6.28	6.37	6.25

STANDARD ERRORS OF DIFFERENCES

PHORATE	MENAZON (1)	MENAZON (2)
0.062	0.050	0.050

PHORATE MENAZON (1)	PHORATE MENAZON (2)	MENAZON (1) MENAZON (2)	PHORATE MENAZON (1) MENAZON (2)
0.087	0.087	0.071	0.124

Mean D.M. % 85.3

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73/R/BS/8

SPRING BARLEY

EFFECT OF N AND PLOT LENGTH ON COMBINE PERFORMANCE

Object: To study the performance of the Claas 'Compact 20' and 'Sampo' combines in harvesting barley on different plot lengths at a range of nitrogen rates and to compare with hand harvesting - Long Hoos IV.

Sponsors: J.C. Wilson, R. Moffitt.

Design: 8 blocks of 6 plots split into 4.

Whole plot dimensions: Claas: 2.41 x 16.5
Sampo: 3.05 x 16.5

Treatments: All combinations of:

Whole plots: 1. Width of area harvested: WIDTHCM

165 cm as 13 rows, 12.7 cm (5 inches) apart, harvested by 'Claas Compact 20' combine on mechanically harvested sub plots — 165Claas

203 cm as 16 rows, 12.7 cm (5 inches) apart, harvested by 'Sampo' combine on mechanically harvested sub plots — 203Sampo

2. Nitrogen fertiliser (kg N): N

45	45
90	90
135	135

Sub plots: 3. Length of area harvested and method of harvest: LENGTHM

1.52m (5 feet) harvested by hand	1.52Hand
1.52m (5 feet) harvested by machine	1.52Comb
3.05m (10 feet) harvested by machine	3.05Comb
6.10m (20 feet) harvested by machine	6.10Comb

NOTE: The 5 feet 16 row plots planned for hand harvesting were harvested by Sampo combine.

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Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:14:28) at 390 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 290 l).

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Ploughed: 26 Sept, 1972. PK applied and seed sown: 21 Mar, 1973. N applied: 25 Mar. Weedkiller applied: 18 May. Combine harvested: 13 Aug. Previous crops: Barley 1971, winter wheat 1972.

NOTE: The Claas combine cut 13 rows (at 5 in., about 13 cm) between single missing rows, the Sampo cut 16 rows between pairs of missing rows. Paths 2 feet (61 cm) wide were cut at all cross-boundaries. All yields have been adjusted for edge effects (Widdowson, F.V., Experimental Husbandry, 23, 16-20, 1973), the factors used were 0.69 (Claas) and 0.71 (Sampo).

Standard errors per plot (pooled whole and sub plot). Grain, tonnes/hectare:

WIDTHCM 165Claas only (LENGTHM 1.52Hand omitted):	0.379 or 6.7%	(56 d.f.)
WIDTHCM 203Sampo only:	0.405 or 7.1%	(80 d.f.)
Pooled (all treatments):	0.394 or 7.0%	(16 d.f.)

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73/R/BS/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

WIDTHCM 165Claas LENGTHM 1.52Hand Omitted

	N 45	N 90	N 135	LENGTHM 1.52 Comb	LENGTHM 3.05 Comb	LENGTHM 6.10 Comb	Mean	WIDTHCM 165Claas LENGTHM 1.52Hand
WIDTHCM								
203Sampo	5.59	5.79	5.62	5.78	5.62	5.49	5.67	
165Claas	5.49	5.86	5.69	5.64	5.64	5.75	5.68	
N								
45				5.60	5.50	5.52	5.55	5.19
90				5.86	5.79	5.78	5.82	5.33
135				5.73	5.61	5.55	5.65	5.06
Mean				5.73	5.63	5.62	5.67	5.19

N	45			90			135		
LENGTHM	1.52 Comb	3.05 Comb	6.10 Comb	1.52 Comb	3.05 Comb	6.10 Comb	1.52 Comb	3.05 Comb	6.10 Comb
WIDTHCM									
203Sampo	5.69	5.54	5.44	5.85	5.78	5.68	5.79	5.55	5.35
165Claas	5.41	5.45	5.60	5.89	5.80	5.89	5.63	5.68	5.76

Grand mean 5.61
Mean D.M. % 82.1

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STANDARD ERRORS OF DIFFERENCES

WIDTHCM 165Claas LENGTHM 1.52Hand omitted

WIDTHCM	N	LENGTHM	
0.061	0.075	1.52 Comb v 3.05 Comb or 6.10 Comb	0.073
		3.05 Comb v 6.10 Comb	0.081

WIDTHCM N		WIDTHCM LENGTHM		N LENGTHM	
203Sampo	0.099	203Sampo v any of remainder	1.52Comb 0.099	1.52Comb	0.114
165Claas	0.114			3.05Comb or 6.10Comb	0.139
203Sampo v 165Claas	0.107	Between any of remainder	0.114	1.52Comb v 3.05 Comb or 6.10Comb	0.127

	WIDTHCM LENGTHM N	
Any 203Sampo	1.52Comb v remainder	0.171
Between any of remainder		0.197

WIDTHCM 165Claas LENGTHM 1.52Hand only

N
0.197

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73/S/BS/1

SPRING BARLEY

VARIETIES, N AND FUNGICIDE

Object: To study the effects of a range of nitrogen levels, applied to seedbed or as a top dressing, on the yield of three barley varieties. The effects of a fungicide against brown rust are also studied - Saxmundham, Grove Plot.

Sponsors: F.V. Widdowson, A. Penny.

Design: 3 randomised blocks of 9 plots split into 2.

Whole plot dimensions: 2.43 x 12.2. Area harvested: 0.00045.

Treatments: All combinations of:-

Whole plots:	1.	Varieties:	VARIETY
		Julia	Julia
		Mazurka	Mazurka
		Midas	Midas
	2.	Nitrogen fertiliser (kg N):	NRATE
		50	50
		100	100
		150	150
	3.	Time of applying nitrogen:	NTIME
		All to seedbed on 20 Mar	Seedbed
		Half to seedbed, half top dressed on 22 May	SB/TD
		All top dressed on 22 May	Topdress
Sub plots:	4.	Fungicide spray against brown rust:	FUNGCIDE
		None	None
		BAS3170F applied at 1.4 kg a.i. in 340 l on 19 June repeated on 10 July	BAS3170F

Basal applications: Manures: (0:20:20) at 280 kg. Weedkiller: Dichlorprop and MCPA ('Mephetol plus' at 5.6 l in 340 l). Fungicide: Tridemorph ('Calixin' at 0.7 l) applied with the weedkiller.

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73/S/BS/1

Seed: Dressed with ethirimol, sown at 190 kg.

Cultivations, etc.:- Ploughed: 27 Oct, 1972. PK applied, seed sown: 21 Mar, 1973. Weedkiller and fungicide applied: 22 May. Cut by hand: 15 Aug. Previous crops: Barley 1971, 1972.

NOTE: Brown rust (Puccinia hordei) and mildew (Erysiphe graminis) were assessed on 16 July.

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.248 or 4.9% (6 d.f.)
Sub plot: 0.274 or 5.5% (8 d.f.)

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T3/3/56/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	TRACE			NITRE			FUNGICIDE		
	50	100	150	Seedbed	SB/TD	Top dress	None	MAS317.05	Mean
VARIETY									
Julia	4.37	5.59	5.47	4.90	5.22	5.30	5.01	5.27	5.14
Mazurka	3.97	4.87	5.34	4.79	4.72	4.68	4.54	4.82	4.73
Midas	4.55	5.36	5.54	5.17	5.24	5.03	4.99	5.41	5.15
NITRE									
50				4.28	4.33	4.29	4.23	4.36	4.30
100				5.22	5.46	5.13	5.06	5.49	5.27
150				5.37	5.38	5.60	5.25	5.65	5.45
NITRE									
Seedbed							4.92	4.99	4.95
SB/TD							4.99	5.13	5.06
Topdress							4.63	5.39	5.01
Mean							4.85	5.17	5.01

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73/S/BS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

STANDARD ERRORS OF DIFFERENCES

VARIETY	NRATE	NTIME	FUNGCIDE	VARIETY NRATE	VARIETY NTIME	NRATE NTIME
0.117	0.117	0.117	0.075	0.202	0.202	0.202

	VARIETY FUNGCIDE	NRATE FUNGCIDE	NTIME FUNGCIDE
	0.148	0.148	0.148
Except when comparing means with same level of VARIETY	0.129		
NRATE		0.129	
NTIME			0.129

Mean D.M. % 87.8

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73/S/BS/1

STRAW: TONNES/HECTARE

	NRATE			NTIME			FUNGCIDE		
	50	100	150	Seedbed	SB/TD	Top dress	None	BAS3170F	Mean
VARIETY									
Julia	3.80	4.79	5.11	4.70	4.59	4.40	4.51	4.62	4.56
Mazurka	3.84	4.82	5.30	4.81	4.86	4.30	4.67	4.64	4.65
Midas	4.01	4.93	5.20	4.96	4.67	4.52	4.88	4.55	4.77
			NRATE						
			50	4.01	3.88	3.75	3.84	3.92	3.88
			100	4.91	5.03	4.61	4.91	4.79	4.85
			150	5.55	5.20	4.86	5.31	5.10	5.20
					NTIME				
					Seedbed		4.94	4.70	4.82
					SB/TD		4.78	4.63	4.70
					Topdress		4.34	4.47	4.41
Mean							4.69	4.60	4.64

Mean D.M. % 88.5

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73/R/OW/1

WINTER OATS

SOWING DATES, APHIDS AND BYDV

Object: To study the effects on grain yield and incidence of cereal aphids and barley yellow dwarf virus (BYDV) of insecticides applied at various times to winter oats sown at a range of dates - White Horse I.

Sponsor: R.T. Plumb.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 24.4. Area harvested: 0.00390.

Treatments: All combinations of:-

1. Date of sowing:	DATE
Early, 25 September, 1972	Early
Middle, 26 October, 1972	Middle
Late, 23 November, 1972	Late
2. Phorate granules to seedbed (kg)	**PHORATE**
0	0
5	5
3. Menazon spray in May (1 'Saphi-Col)	**MENAZON**
0.0	0.0
0.7	0.7

Basal applications: Manures: 310 kg (0:20:20) combine drilled, 280 kg 'Nitro-Chalk'. Weedkiller: MCPA, mecoprop and dicamba ('Tetralex plus' at 7.0 l in 220 l).

Seed: Peniarth sown at 190 kg.

Cultivations, etc.:- Deep-tine cultivated: 15 Sept and 18 Sept, 1972. Spring-tine cultivated: 20 Sept. Phorate applied, plots to be sown power harrowed and seed sown: 25 Sept. Phorate applied, plots to be sown power harrowed and seed drilled: 26 Oct. Phorate applied, plots to be sown and power harrowed: 22 Nov. Seed sown: 23 Nov. N applied: 12 Apr, 1973. Weedkiller applied: 17 Apr. Menazon applied: 21 May.

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Combine harvested: 2 Aug. Previous crops: Winter wheat 1971, spring wheat 1972.

NOTE: On four occasions counts were made of numbers of tillers and percentage infection by BYDV and of numbers and species of aphids.

Standard error per plot.
Grain, tonnes/hectare: 0.370 or 7.3% (33 d.f.)

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73/R/CW/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	PHORATE		MENAZON		Mean
	0	5	0.0	0.7	
DATE					
Early	5.06	5.35	5.07	5.34	5.21
Middle	4.79	5.10	4.80	5.09	4.95
Late	5.11	5.06	5.13	5.04	5.09
	PHORATE				
	0		4.90	5.07	4.99
	5		5.11	5.24	5.17
Mean			5.00	5.16	5.08

PHORATE	0		5	
MENAZON	0.0	0.7	0.0	0.7
DATE				
Early	4.90	5.21	5.25	5.46
Middle	4.57	5.01	5.03	5.18
Late	5.23	4.99	5.04	5.08

STANDARD ERRORS OF DIFFERENCES

DATE	PHORATE	MENAZON	DATE PHORATE	DATE MENAZON	PHORATE MENAZON	DATE PHORATE MENAZON
0.131	0.107	0.107	0.185	0.185	0.151	0.262

Mean D.M. % 85.2

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73/R/BE/1

WINTER BEANS

VIRUS CONTROL

Object: To study the effects of heat treatment of seed, roguing and control of weevil vectors on yield and incidence of Broad Bean Stain and Broad Bean True Mosaic Viruses in field beans - Pastures.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 4.27 x 15.2. Area harvested: 0.00650.

Treatments: Virus control: VRUSCONT

None	0
Seed heat treated (4 days at 55-60 C), crop rogued	HR
Seed not heat treated, crop rogued	R
Seed heat treated, crop rogued and sprayed with gamma BHC	HRS
Seed not heat treated, crop rogued and sprayed with gamma BHC	RS

Roguing was done on 11 Dec, 1972, 23 Mar, 1973, 27 Apr, 31 May. Insecticide treatment spray was 0.28 kg gamma BHC in 340 l on 23 Mar, repeated on 6 June.

Basal applications: Manures: (0:14:28) at 400 kg, placement drilled.

Seed: Throws MS sown at 350 kg.

Cultivations, etc.:- Ploughed: 23 Sept, 1972. Rotary harrowed: 2 Oct. Seed sown: 6 Oct. Tractor hoed: 19 Apr and 3 May, 1973. Combine harvested: 23 Aug. Previous crops: Barley 1971, barley 1972.

NOTES: (1) Plant populations were determined on 21 Mar. Incidence of viruses was assessed on 11 Dec and 7 July. Adult weevil damage was assessed on 14 Dec, 21 Mar and 16 Apr. Adult weevil populations were assessed on 7 June. Seed samples were taken at harvest for assessment of virus infection.

(2) Owing to a blockage during combining, yields from two plots (treatments HR and HRS) were not recorded. Estimated values were used in the analysis.

Standard error per plot.
Grain, tonnes/hectare: 0.300 or 9.6% (10 d.f.)

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73/R/BE/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VRUSCONT

0	HR	R	HRS	RS	Mean
2.89	3.27	3.07	3.25	3.15	3.12

STANDARD ERROR OF DIFFERENCES

VRUSCONT

0.212

Mean D.M. % 85.7

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73/R/BE/3

SPRING BEANS

VIRUS CONTROL

Object: To study the effects of heat treatment of seed, roguing and control of weevil vectors on yield and incidence of Broad Bean Stain and Broad Bean True Mosaic Viruses in field beans - Great Knott II.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 4.27 x 15.2. Area harvested: 0.00650.

Treatments: Virus control:

	VRUSCONT
None	0
Seed heat treated (4 days at 55-60°C), crop rogued	HR
Seed not heat treated, crop rogued	R
Seed heat treated, crop rogued and sprayed with gamma BHC	HRS
Seed not heat treated, crop rogued and sprayed with gamma BHC	RS

The heat treated seed failed to germinate. Roguing was done on 4, 25 May, 7 June. (Roguing was abandoned on 29 June as too many plants infected.) Insecticide treatment spray was 0.28 kg gamma BHC applied in 340 l on 6 June, repeated on 3 July.

Basal applications: Manures: Ground chalk at 7.5 tonnes, (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Seed sown: 14 Mar, 1973. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Incidence of viruses was assessed on 29 June and 25 July. Adult weevil populations were assessed on 7 June. Seed samples were taken at harvest for assessment of virus infection.

Standard error per plot.
Grain, tonnes/hectare: 0.406 or 8.7% (6 d.f.)

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73/P/BE/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VRUSCONT

O	R	RS	Mean
4.53	4.49	4.93	4.65

STANDARD ERROR OF DIFFERENCES

VRUSCONT

0.287

Mean D.M. % 82.9

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73/R/2E/4

SPRING BEANS

VARIETIES AND VIRUSES

Object: To study the spread and effects on yield of Broad Bean Stain and Broad Bean True Mosaic Viruses in different varieties of field beans - Great Knott II.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 6.40 x 15.2. **Area harvested:** 0.00488.

Treatments: Varieties

	VARIETY
Hertz Freya	Freya
Maris Bead	Bead
Minden	Minden
Minor	Minor

Basal applications: Manures: Ground chalk at 7.5 tonnes, (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 0.84 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 12-21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Seed sown and weedkiller applied: 23 Mar, 1973. Insecticide applied: 8 June. Combine harvested: 4 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Incidence of viruses was assessed on 9, 25 May, 7, 29 June, 17 July. Adult weevil damage was assessed on 17 May. Seed samples were taken at harvest for assessment of virus infection.

Standard error per plot.
Grain, tonnes/hectare: 0.290 or 8.2% (9 d.f.)

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73/R/BE/4

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VARIETY

Freya	Bead	Minden	Minor	Mean
3.58	3.10	4.05	3.51	3.56

STANDARD ERROR OF DIFFERENCES

VARIETY

0.205

Mean D.M. % 80.5

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73/R/BE/5

SPRING BEANS

CONTROL OF PESTS AND DISEASES

Object: To study the effects of a range of chemicals on pest and disease incidence and yield of beans using a seed stock infected with seed-borne viruses and not isolated from other bean crops (see also 73/R/CS/95) - Great Knott II.

Sponsors: R. Bardner, A.J. Cockbain, D. Hornby, G.A. Salt.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 19.2. Area harvested: 0.00615.

Treatments: Chemicals (kg):

	CHEMICAL
None	None
Aldicarb nematicide/insecticide, 4.5 applied as granules	Aldicarb
Gamma BHC insecticide, 2.2 in 290 l	BHC
Dexon fungicide, 78.5 in 290 l	Dexon
Dieldrin insecticide, 2.2 in 290 l	Dieldrin

Basal applications: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn to area not treated in 1971. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Treatments applied and all plots rotary cultivated: 12 Mar, 1973. Seed sown: 13 Mar. Weedkiller applied: 16 Mar. Insecticide applied: 8 June. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

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NOTE: The following observations were made:-
(1) Incidence of viruses.
(2) Adult weevil populations.
(3) Damage to plants by adult weevils.
(4) Incidence of wilt.
(5) Incidence of Aphis fabae.
(6) Root health.
(7) Sitona larvae in soil.

Standard error per plot.
Grain, tonnes/hectare: 0.391 or 11.8% (12 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CHEMICAL

None	Aldicarb	BHC	Dexon	Dieldrin	Mean
3.18	3.61	3.33	3.10	3.32	3.31

STANDARD ERROR OF DIFFERENCES

CHEMICAL

0.277

Mean D.M. % 81.9

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73/R/BE/6

SPRING BEANS

ALDICARB AND CROP HEALTH

Object: To study the yield and incidence of viruses and stem eelworm in two varieties of field beans grown with and without aldicarb in 1972 and the effects of fresh treatment in 1973 - Great Knott II.

Sponsors: A.J. Cockbain, D.J. Hooper, J. McEwen.

Design: 3 randomised blocks of 4 plots, split into 2.

Whole plot dimensions: 6.40 x 19.2. Sub plot area harvested: 0.00293.

Treatments: All combinations of:-

Whole plots:	1. Varieties	VARIETY
	Maris Bead	Bead
	Minor	Minor
	2. Aldicarb in 1972 (kg)	ALDICARB(72)
	None	0.0
	4.5	4.5
Sub plots:	3. Aldicarb in 1973 (kg)	ALDICARB(73)
	None	0.0
	5.0	5.0

Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg, Epsom salts at 900 kg - autumn 1972 to the area which did not receive this dressing in autumn 1971. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Aldicarb applied, rotary cultivated, seed sown: 13 Mar, 1973. Weedkiller applied: 16 Mar. Insecticide applied: 8 June. Combine harvested: 4 Sept. Previous crops: Winter wheat 1971, barley 1972.

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NOTES: (1) Adult weevil damage was assessed on 4 May and populations on 14 June. Incidence of viruses was assessed on 25 May, 29 June and 24 July.
(2) Counts of stems showing symptoms of attack by stem eelworm were made in August on the variety Maris Bead.

Standard errors per plot. Grain, tonnes/hectare.
Whole plot: 0.338 or 9.3% (6 d.f.)
Sub plot: 0.737 or 20.2% (8 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	ALDICARB(72)		ALDICARB(73)		
	0.0	4.5	0.0	5.0	Mean
VARIETY					
Bead	3.31	3.24	2.63	3.91	3.27
Minor	3.93	4.10	4.01	4.02	4.01
		ALDICARB(72)			
		0.0	3.34	3.90	3.62
		4.5	3.31	4.03	3.67
Mean			3.32	3.96	3.64

ALDICARB(72)	0.0		4.5	
ALDICARB(73)	0.0	5.0	0.0	5.0
VARIETY				
Bead	2.85	3.76	2.42	4.06
Minor	3.83	4.03	4.19	4.01

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STANDARD ERRORS OF DIFFERENCES

VARIETY	ALDICARB(72)	ALDICARB(73)	VARIETY ALDICARB(72)	VARIETY ALDICARB(73)	ALDICARB(72) ALDICARB(73)	VARIETY ALDICARB(72) ALDICARB(73)
0.195	0.195	0.301	0.276	0.358	0.358	0.507

Except when comparing means with same level of

VARIETY		0.425	
ALDICARB(72)			0.425
VARIETY.ALDICARB(72)			0.602

Mean D.M. % 81.4

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73/R/BE/7

SPRING BEANS

EFFECTS OF APHIDS

Object: To study the effects of applying liquid or granular insecticides at different times on yield and aphid control - Great Knott II.

Sponsors: R. Bardner, J.H. Stevenson, K.E. Fletcher.

Design: 5 randomised blocks of 6 plots.

Whole plot dimensions: 5.34 x 12.2. Area harvested: 0.00390.

Treatments: Insecticides:-

	INSCTCDE
None	0
Phorate at 1.12 kg as granules:	
At start of flowering, 7 June	PGE
At end of flowering, 9 July	PGL
Demeton-s-methyl at 0.25 kg in 370 l:	
At start of flowering, 6 June	DSE
At end of flowering, 9 July	DSL
At start and again at end of flowering	DSEL

Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg and Epsom salts at 900 kg to part which did not receive this dressing in 1970. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Spring-tine cultivated: 8 Mar, 1973. Seed sown: 9 Mar. Weedkiller applied: 16 Mar. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Aphid counts were made throughout the season.

Standard error per plot.
Grain, tonnes/hectare: 0.375 or 9.3% (20 d.f.)

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73/R/BE/7

TABLES OF MEANS

GRAIN: TONNES/HECTARE

INSCTCDE

0	PGE	PGL	DSE	DSL	DSEL	Mean
3.70	4.38	3.65	4.21	3.90	4.27	4.02

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.237

Mean D.M. % 83.7

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73/R/BE/9

SPRING BEANS

INSECTICIDES AND BENEFICIAL INSECTS

Object: To study the effect of two insecticides on beneficial insects, particularly predators and parasites of aphids, and the yield of field beans - Pastures.

Sponsor: J.H. Stevenson.

Design: Small plots: 2 randomised blocks of 3 plots.
Large plots: 3 randomised blocks of 3 plots.

Whole plot dimensions: Small plots: 17.1 x 21.3. Area harvested: 0.00293
Large plots: 36.3 x 36.6. Area harvested: 0.00585

Treatments:	PLOTSIZE
One experiment with small plots	Small
One experiment with large plots	Large

Treatments identical on both experiments:-

Insecticidal sprays just before flowering, 26 June:	INSCTCDE
None	None
Dimethoate 0.34 l in 740 l	Dimeth
Menazon 0.28 kg in 740 l	Menazon

Basal applications: Manures: (0:20:20) at 1300 kg, Epsom salts at 900 kg, broadcast in autumn. (0:14:28) at 400 kg, placement drilled.
Weedkillers: Paraquat at 0.42 kg ion in 220 l, and simazine at 1.1 kg in 220 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 11 Sept, 1972. Epsom salts applied: 20 Sept. Ploughed: 23 Sept. Paraquat applied: 28 Nov. Seed sown: 10 Mar, 1973. Simazine applied: 13 Mar. Combine harvested: 5 Sept. Previous crops: Barley 1971 and 1972.

NOTE: Aphid counts (Aphis fabae), sweep net samples of insects and samples for insects using portable insect suction sampler were made throughout the season. Carabid beetle samples from pit fall traps were taken just before and for 5 weeks after spraying. Water traps for insects were maintained in the crop during the latter part of the season.

Standard error per plot. PLOTSIZE Large.
Grain, tonnes/hectare: 0.219 or 6.3% (4 d.f.)

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TB/A/[illegible]/9

TABLES OF MEANS

GRAIN: [illegible]/HECTARE

	INSCTCDE			
	None	Dimeth	Menazon	Mean
PLOTSIZE				
Small	3.82	3.54	3.86	3.74
Large	2.96	3.71	3.79	3.49

STANDARD ERROR OF DIFFERENCES PLOTSIZE Large

INSCTCDE

0.179

Mean D.M. % 82.8

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73/R/BE/10

SPRING BEANS

EFFECTS OF HEAT TREATMENTS

Object: To study the effects of a range of heat treatments of seed on germination, incidence of seed borne viruses and yield of beans - Garden Plot 2.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 2.03 x 10.7. Area harvested: 0.00108.

Treatments: Heat treatment of seed:

	HEATTRMT
None	None
Seed kept for 2 days at 60°C	2Day60
Seed kept for 4 days at 60°C	4Day60
Seed kept for 8 days at 60°C	8Day60
Seed kept for 2 days at 65°C	2Day65
Seed kept for 4 days at 65°C	4Day65
Seed kept for 8 days at 65°C	8Day65

Basal applications: Manures: (0:20:20) at 780 kg. Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl at 0.25 kg in 290 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- PK fertiliser applied: 24 Nov, 1972. Ploughed: 30 Nov. Rotary cultivated and seed sown: 29 Mar, 1973. Weedkiller applied: 3 Apr. Insecticide applied: 26 June. Combine harvested: 7 Sept. Previous crops: Winter wheat 1971, potatoes 1972.

NOTES: (1) Seedling emergence counts were made and virus infection assessed on 29 May.
(2) Some treatments killed most seeds. Yields were taken only from 'None', '2Day60' and '2Day65'.

Standard error per plot.
Grain, tonnes/hectare: 0.343 or 18.2% (6 d.f.)

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73/R/BE/10

TABLE OF MEANS

GRAIN: TONNES/HECTARE

HEATTRMT

None	2Day60	2Day65	Mean
3.00	1.44	1.21	1.89

STANDARD ERROR OF DIFFERENCES

HEATTRMT

0.242

Mean D.M. % 80.2

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73/R/BE/11

SPRING BEANS

IRRIGATION, N AND CARBOHYDRATE

Object: To study the effects of nitrogen fertiliser, sucrose and irrigation applied at flowering time, on yield and its components in field beans - Long Hoos VI.

Sponsor: J. McEwen.

Design: 4 randomised blocks of 2 plots split into 6.

Whole plot dimensions: 2.03 x 3.05. Area harvested: 0.00019.

Treatments: All combinations of:-

Whole plots:	1.	Irrigation (mm of water, applied during 3-week flowering period)	IRRIGN
		None	0
		11	11
Sub plots:	2.	Nitrogen fertiliser (kg N) just before flowering, 7 June	N
		None	0
		150	150
	3.	Sucrose (kg) divided equally between three foliar sprays during flowering	SUCROSE
		None	0
		150	150
		450	450

Irrigation: 3 mm on 16 June, 8 mm on 20 June. Sucrose was applied in 1000 l: 10, 17 and 30 June.

Basal applications: Manures: (0:20:20) at 780 kg. Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl 0.25 kg in 290 l. Fungicide: Benomyl at 1.5 kg in 1000 l (applied with sucrose on plots receiving it).

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- PK applied: 29 Nov, 1972. Ploughed: 18 Dec. Power harrowed, seed sown: 12 Mar, 1973. Insecticide applied: 6 June. Benomyl applied: 10 June. Hand harvested: 12 Sept. Previous crops: Maize 1971, fallow 1972.

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NOTE: Counts were made of the numbers of stems and pods. 1000 grain weights and % N in grain were measured.

Standard error per sub plot.
Grain, tonnes/hectare: 0.315 or 5.9% (30 d.f.)

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73/R/BE/11

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N		SUCROSE			
	0	150	0	150	450	Mean
IRRIGN						
0	5.18	5.66	5.70	5.51	5.05	5.42
11	5.28	5.24	5.20	5.29	5.30	5.26
		N				
		0	5.34	5.24	5.10	5.23
		150	5.56	5.55	5.24	5.45
Mean			5.45	5.40	5.17	5.34

N		0			150	
SUCROSE	0	150	450	0	150	450
IRRIGN						
0	5.48	5.31	4.74	5.92	5.71	5.36
11	5.20	5.17	5.47	5.20	5.40	5.13

STANDARD ERRORS OF DIFFERENCES

N	SUCROSE	IRRIGN* N	IRRIGN* SUCROSE	N SUCROSE	IRRIGN* N SUCROSE
0.091	0.111			0.157	
Except when comparing means with same level of IRRIGN		0.128	0.157		0.222

* Within the same level of IRRIGN only

Mean D.M. % 85.3

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73/R/BE/12

SPRING BEANS

CONTROL OF WEEVILS

Object: To study the effect of some insecticides on the incidence of adult weevils and on yield of field beans - Pastures.

Sponsors: A.J. Cockbain, P. Etheridge.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 16.5 x 18.3. Area harvested: 0.00293.

Treatments: Insecticides (kg):

	INSCTCDE
None	None
Gamma BHC, 0.5 as spray	BHC
Fenitrothion, 0.75 as spray	Fenitro
Malathion, 1.0 as spray	Malathio
Methomyl, 1.0 as spray	Methomyl
Phorate, 1.0 as granules	Phorate

Sprays were applied on 31 May, in 670 l, and were repeated on 23 June, in 450 l. Granules were applied on 1 June, repeated on 25 June.

Basal applications: Manures: (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled. Weedkillers: Paraquat at 0.42 kg ion in 220 l, simazine at 1.1 kg in 220 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- Autumn PK and Epsom salts applied: 20 Sept, 1972. Ploughed: 5 Oct. Paraquat applied: 28 Nov. Seed sown: 10 Mar, 1973. Simazine applied: 13 Mar. Combine harvested: 5 Sept. Previous crops: Barley 1971, barley 1972.

NOTE: Adult weevil populations were assessed 1, 2, 4, 8, 12, 16 and 20 days after first spray treatment and 2, 10, 20 days after second treatment. Black aphid populations were assessed on 2 July and green aphid on 4 July.

Standard error per plot.
Grain, tonnes/hectare: 0.360 or 8.6% (10 d.f.)

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73/R/BE/12

TABLE OF MEANS

GRAIN: TONNES/HECTARE

INSCTCDE

None	BHC	Fenitro	Malathio	Methomyl	Phorate	Mean
3.36	4.35	4.62	4.16	4.28	4.29	4.18

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.294

Mean D.M. % 83.4

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73/R/P/1 and 73/W/P/1

POTATOES

SEED STOCKS AND SEED TREATMENT

Object: To study the effects of treating tubers with fumigant and systemic fungicides on tuber-borne diseases and yield of potatoes - Rothamsted (R) Little Hoos and Woburn (W) Horsepool.

Sponsors: G.A. Hide, R.L. Griffith, F. Bell.

Design: 4 blocks of 8 plots split into 4 (plus one extra block for sampling).

Whole plot dimensions: 5.69 x 9.52. Area harvested: 0.00135.

Treatments: All combinations of:-

Whole plots: 1. Varieties:	VARIETY
Pentland Crown	Crown
King Edward, Little Hoos (R) only	Edward
Majestic	Majestic
Maris Piper, Horsepool (W) only	Piper
Record	Record
2. Seed health:	HEALTH
Once grown	Onegrown
Healthier	Healthy
Sub plots: 3. Fungicide to seed tubers:	FUNGCIDE
None	None
Benomyl	Benomyl
Sec-butylamine (0.28 l per tonne of seed)	Secbutyl
Thiabendazole	Thiabend

NOTE: Benomyl and Thiabendazole applied as 0.1% dip at pH3 for 5 minutes. Sec-butylamine applied as a fumigant vapour.

Basal applications: Manures: (13:13:20) at 1500 kg, Little Hoos (R), 1830 kg Horsepool (W). Weedkillers: Paraquat at 0.56 kg ion in 280 l, Horsepool (W). Linuron at 1.2 kg with paraquat at 0.42 kg ion in 450 l, Little Hoos (R), 280 l Horsepool (W). Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 370 l, Little Hoos (R), 390 l Horsepool (W). Fungicide: Mancozeb at 1.3 kg, in 370 l on two occasions, Little Hoos (R), in 390 l on the first occasion, in 370 l on the second occasion, Horsepool (W).

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73/R/P/1 and 73/W/P/1

Cultivations, etc.:-

Little Hoos (R): Deep-tine cultivated three times: 7 Aug, 1972, 22 Aug, 11 Sept. NPK applied: 23 Mar, 1973. Rotary cultivated, potatoes planted: 13 Apr. Weedkiller applied: 18 May. Fungicide with insecticide applied: 2 July. Fungicide applied: 24 July, 9 Aug. Sprayed with undiluted BOV at 220 l: 18 Sept. Lifted: 10 Oct. Previous crops: Barley 1971, grass ley 1972.

Horsepool (W): Paraquat applied: 2 Oct, 1972. Ploughed: 3 Jan, 1973. NPK applied: 26 Mar. Rotary harrowed, potatoes planted: 12 Apr. Linuron and paraquat applied: 12 May. Grubbed: 6 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 8 Oct. Previous crops: Barley 1971, beans 1972.

NOTE: Emergence counts were made in May. Samples were taken throughout the season for tuber-size distribution and disease assessments on growing progeny tubers. After burning off and before lifting, counts were made of plant and stem numbers. After harvest tubers were graded into 6 sizes and estimates were made of tuber infection with Oospora, Rhizoctonia, Helminthosporium and Phoma.

Standard errors per plot. Total tubers, tonnes/hectare:

Little Hoos (R):	Whole plot:	1.28 or 2.8%	(21 d.f.)
	Sub plot:	2.17 or 4.7%	(72 d.f.)
Horsepool (W):	Whole plot:	2.50 or 7.6%	(21 d.f.)
	Sub plot:	3.59 or 10.9%	(72 d.f.)

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73/R/P/1 and 73/W/P/1

TABLES OF MEANS

LITTLE HOOS (R)

TOTAL TUBERS: TONNES/HECTARE

	HEALTH		FUNGCIDE				
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	Mean
VARIETY							
Crown	51.0	52.2	53.2	50.9	49.7	52.5	51.6
Edward	48.8	48.4	49.0	49.5	47.8	47.9	48.6
Majestic	47.4	51.9	49.8	49.7	48.9	50.2	49.6
Record	31.3	40.5	36.8	36.4	34.1	36.4	35.9
HEALTH							
Onegrown			45.4	44.9	43.4	44.8	44.6
Healthy			49.1	48.3	46.9	48.7	48.2
Mean			47.2	46.6	45.1	46.7	46.4

HEALTH	Onegrown				Healthy			
FUNGCIDE	None	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
VARIETY								
Crown	51.5	50.5	49.6	52.3	55.0	51.2	49.9	52.7
Edward	49.2	49.8	48.8	47.4	48.8	49.3	46.9	48.4
Majestic	48.0	47.2	46.7	47.8	51.6	52.2	51.1	52.5
Record	32.9	32.1	28.6	31.8	40.7	40.7	39.5	41.0

STANDARD ERRORS OF DIFFERENCES

VARIETY	HEALTH	FUNGCIDE	VARIETY HEALTH	VARIETY FUNGCIDE	HEALTH FUNGCIDE	VARIETY HEALTH FUNGCIDE
0.64	0.45	0.54	0.90	1.14	0.80	1.61

Except when comparing means with same levels of

VARIETY	1.09
HEALTH	0.77
VARIETY.HEALTH	1.54

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73/R/P/1 and 73/M/P/1

LITTLE HOOS (R)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	HEALTH		FUNGCIDE				
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	Mean
VARIETY							
Crown	95.3	94.5	94.8	94.1	96.0	94.7	94.9
Edward	75.5	72.1	74.0	70.3	76.7	74.1	73.8
Majestic	85.1	83.4	85.2	83.2	84.0	84.8	84.3
Record	82.1	83.4	83.1	82.6	83.3	82.0	82.8
HEALTH							
Onegrown			85.5	83.1	85.1	84.3	84.5
Healthy			83.0	82.0	84.9	83.5	83.4
Mean			84.3	82.5	85.0	83.9	83.9

HEALTH	Onegrown				Healthy			
FUNGCIDE	None	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
VARIETY								
Crown	95.5	94.8	96.2	94.9	94.2	93.4	95.9	94.5
Edward	76.3	71.5	77.9	76.4	71.8	69.0	75.6	71.8
Majestic	87.4	84.1	83.4	85.7	83.0	82.3	84.6	83.9
Record	83.0	81.8	83.0	80.4	83.3	83.4	83.6	83.5

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73/R/P/1 and 73/W/P/1

HORSEPOOL (W)

TOTAL TUBERS: TONNES/HECTARE

	HEALTH		FUNGCIDE				
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	Mean
VARIETY							
Crown	33.4	33.6	33.6	31.7	36.5	32.3	33.5
Majestic	32.0	32.2	31.1	32.5	31.2	33.4	32.1
Piper	33.7	33.6	32.8	34.2	33.4	34.2	33.6
Record	32.4	31.4	32.3	34.9	27.8	32.6	31.9
HEALTH							
Onegrown			31.7	33.7	33.4	32.8	32.9
Healthy			33.3	33.0	31.0	33.5	32.7
Mean			32.5	33.3	32.2	33.1	32.8

HEALTH	Onegrown				Healthy			
FUNGCIDE	None	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
VARIETY								
Crown	34.0	31.9	37.0	30.8	33.2	31.5	36.0	33.8
Majestic	29.6	32.2	33.2	33.0	32.7	32.8	29.3	33.8
Piper	31.9	34.9	34.4	33.7	33.8	33.5	32.4	34.7
Record	31.2	35.7	29.3	33.6	33.3	34.2	26.3	31.7

STANDARD ERRORS OF DIFFERENCES

VARIETY	HEALTH	FUNGCIDE	VARIETY HEALTH	VARIETY FUNGCIDE	HEALTH FUNGCIDE	VARIETY HEALTH FUNGCIDE
1.25	0.88	0.90	1.77	1.99	1.41	2.82
Except when comparing means with same levels of						
VARIETY				1.79		
HEALTH					1.27	
VARIETY.HEALTH						2.54

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73/R/P/1 and 73/W/P/1

HORSEPOOL (W)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	HEALTH		FUNGCIDE				
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	Mean
VARIETY							
Crown	93.0	91.0	91.0	91.3	93.4	92.1	92.0
Majestic	80.7	79.9	79.7	79.8	79.2	82.5	80.3
Piper	82.1	82.0	83.7	82.1	81.5	81.0	82.1
Record	77.4	78.4	79.1	78.0	77.1	77.4	77.9
		HEALTH					
		Onegrown	84.4	83.2	82.5	83.1	83.3
		Healthy	82.3	82.5	83.1	83.5	82.8
Mean			83.4	82.8	82.8	83.3	83.1

HEALTH	Onegrown				Healthy			
FUNGCIDE	None	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
VARIETY								
Crown	92.0	93.2	94.5	92.1	90.0	89.4	92.3	92.2
Majestic	79.7	80.5	79.1	83.4	79.7	79.0	79.3	81.6
Piper	85.4	82.4	79.9	80.9	81.9	81.9	83.0	81.2
Record	80.6	76.6	76.5	76.0	77.6	79.5	77.7	78.9

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73/R/P/2

POTATOES

BLIGHT AND APHID REFERENCE PLOTS

Object: To study the separate and combined effect of sprays to control blight and aphids on potatoes - Little Hoos.

Sponsors: J.M. Hirst, O.J. Stedman, R.W. Gibson.

Design: 4 randomised blocks of 7 plots split into 3.

Whole plot dimensions: 8.53 x 9.52. Sub plot area harvested: 0.00271.

Treatments: All combinations of:-

Whole plots:	1.	Blight fungicide:	FUNGCIDE
		None	None
		Mancozeb applied on 3 occasions at 1.3 kg in 370 l	Mancozeb
	2.	Aphicide:	APHICIDE
		None	None
		Demeton-s-methyl applied on 4 occasions, starting early, on 14 June, at 0.25 kg in 370 l	Demeton1
		Demeton-s-methyl applied on 3 occasions, starting with first blight spray on 3 July, at 0.25 kg in 370 l	Demeton2
Sub plots:	3.	Varieties:	VARIETY
		King Edward	Edward
		Majestic	Majestic
		Pentland Crown	Crown

together with one extra treatment, sprayed mancozeb only and split for varieties as above, plot used for sampling (no yields recorded).

Basal applications: Manures: (13:13:20) at 1500 kg. Weedkillers: Linuron at 1.2 kg with paraquat at 0.4 kg ion in 450 l.

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Cultivations, etc.:- Deep-tine cultivated: 7 Aug, 1972, twice 22 Aug, once 11 Sept. NPK applied: 23 Mar, 1973. Rotary cultivated: 13 Apr. Seed planted: 16 Apr. Weedkiller applied: 15 May. Grubbed: 8 June. Insecticide applied to Domtoul plots: 14 June. Reboridged: 15 June. Insecticide with fungicide applied: 3 and 24 July, 11 Aug. Sprayed with undiluted EOV at 220 l.: 18 Sept. Lifted: 12 Oct. Previous crops: Barley 1971, grass 1972.

NOTES: (1) Aphids were counted fortnightly during June and July.
(2) Samples were taken for bulking and size distribution of tubers on 18 June, 2, 16, 30 July, 13, 28 Aug, and 10 Sept.
(3) Estimates were made of the percentage of haulm destroyed by blight and of tubers blighted.

Standard errors per plot. Total tubers, tonnes/hectare:
Whole plot: 1.95 or 4.4% (15 d.f.)
Sub plot: 4.13 or 9.2% (36 d.f.)

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TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	APHICIDE			VARIETY			
	None	Demeton1	Demeton2	Edward	Majestic	Crown	Mean
FUNGICIDE							
None	43.5	43.3	45.1	43.6	44.2	44.2	44.0
Mancozeb	46.4	44.4	45.7	45.3	45.0	46.2	45.5
APHICIDE							
None				44.9	45.6	44.2	44.9
Demeton1				44.2	41.5	45.7	43.8
Demeton2				44.2	46.6	45.5	45.4
Mean				44.4	44.6	45.2	44.7

APHICIDE	None			Demeton1			Demeton2		
VARIETY	Edward	Majestic	Crown	Edward	Majestic	Crown	Edward	Majestic	Crown
FUNGICIDE									
None	42.8	45.5	42.2	44.2	41.1	44.5	43.7	45.9	45.8
Mancozeb	47.0	45.8	46.3	44.2	42.0	47.0	44.7	47.3	45.2

STANDARD ERRORS OF DIFFERENCES

FUNGICIDE	APHICIDE	VARIETY	FUNGICIDE APHICIDE	FUNGICIDE VARIETY	APHICIDE VARIETY	FUNGICIDE APHICIDE VARIETY
0.80	0.98	1.19	1.38	1.59	1.95	2.75
Except when comparing means with some levels of						
FUNGICIDE				1.68		
APHICIDE					2.06	
FUNGICIDE.APHICIDE						2.92

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73/R/P/2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

	APHICIDE			VARIETY			
	None	Demeton1	Demeton2	Edward	Majestic	Crown	Mean
FUNGCIDE							
None	97.6	97.5	97.9	97.4	97.8	97.7	97.6
Mancozeb	97.5	97.3	97.6	97.4	97.4	97.7	97.5
APHICIDE							
None				97.2	97.6	97.8	97.5
Demeton1				97.4	96.9	97.9	97.4
Demeton2				97.6	98.3	97.4	97.8
Mean				97.4	97.6	97.7	97.6

APHICIDE	None			Demeton1			Demeton2		
VARIETY	Edward	Majestic	Crown	Edward	Majestic	Crown	Edward	Majestic	Crown
FUNGCIDE									
None	96.6	98.1	98.0	97.8	96.9	97.7	97.6	98.5	97.5
Mancozeb	97.7	97.1	97.6	96.9	97.0	98.0	97.5	98.2	97.3

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73/W/P/2

POTATOES

CONTROL OF VERTICILLIUM

Object: To study the effects of trace elements, benomyl and forms of nitrogen on yields and incidence of Verticillium of potatoes - Woburn Broadmead I.

Sponsor: G.A. Hide.

Design: 2 blocks of 2 plots, split into 6.

Whole plot dimensions: 5.69 x 27.4. Area harvested: 0.00108.

Treatments: All combinations of:-

Whole plots: 1.	Forms of nitrogen (applied at 163 kg N):	FORM
	Sulphate of ammonia	SA
	Nitrate of soda	NS
Sub plots: 2.	Foliar sprays and drench:	SPRAY
	None	0
	Foliar spray of trace elements	TE
	Foliar spray of trace elements with NPK fertiliser	TEF
	Single foliar spray of benomyl	BS1
	Three foliar sprays of benomyl	BS3
	Soil drench of benomyl at crop emergence	BD

NOTE: (1) The foliar spray of trace elements contained ferrorexanol, borax, ammonium molybdate, and sulphate of magnesium, manganese, copper, cobalt and zinc, applied at a total rate of 0.10 kg. The foliar spray of trace elements with NPK, included in addition, compound fertiliser (22:21:17) at 2.35 kg. Both sprays were applied in 540 l.

(2) Benomyl was applied as a spray at 1.1 kg in 540 l to BS1, at 2.37 kg in 540 l repeated on three occasions to BS3 and at 1.1 kg in 7400 l as a drench to BD.

(3) Because plants died earlier than expected, a planned fourth benomyl spray was omitted.

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Basal applications: Manures: (0:14:28) at 1140 kg. Epsom salts at 650 kg. Weedkillers: Mecoprop at 2.5 kg in 280 l. Paraquat at 0.56 kg ion in 280 l on two occasions. Linuron at 1.7 kg plus paraquat at 0.42 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

Variety: Pentland Dell.

Cultivations, etc.:- Mecoprop applied: 13 Mar, 1973. Paraquat applied: 17 Mar. Basal PK and Mg and test N applied: 28 Mar. Deep-tine cultivated: 5 Apr. Rotary cultivated twice: 11 Apr, 17 Apr. Potatoes planted: 18 Apr. Linuron plus paraquat applied: 14 May. Paraquat applied: 21 May. Soil drench applied: 5 June. Grubbed: 6 June. Rotary ridged: 16 June. Foliar sprays applied to TE, TEF, BS1 and BS3 plots: 28 June. Fungicide with insecticide applied: 5 July. Additional foliar sprays applied to BS3 plots: 11 July, 17 July. Fungicide applied twice: 26 July, 13 Aug. Haulm mechanically destroyed: 23 Aug. Potatoes lifted: 10 Sept. Previous crops: Beans 1971, winter wheat 1972.

NOTES: (4) Verticillium leaf symptom scores were made in June and July.
(5) Yields were poor and there was a large difference between the two blocks, (associated with a difference in past cropping) no standard errors are presented.

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TABLES OF MEANS

SPRAY

FORM	0	TE	TEF	BS1	BS3	BD	Mean
	TOTAL TUBERS: TONNES/HECTARE						
SA	5.1	5.0	6.0	6.4	5.3	4.9	5.4
NS	3.3	2.3	4.6	4.8	3.5	5.4	4.0
Mean	4.2	3.6	5.3	5.6	4.4	5.2	4.7
	PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE						
SA	23.1	13.9	21.7	17.7	14.6	12.6	17.3
NS	4.6	0.0	5.7	17.9	16.3	8.7	8.9
Mean	13.9	7.0	13.7	17.8	15.5	10.7	13.1

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73/R/P/3

POTATOES

SEED SOURCES

Object: To compare stocks of seed freed from tuber borne diseases, by the use of stem cuttings, with local once-grown and bought-in and certified stocks - Little Hoos.

Sponsors: G.A. Hide, F. Bell.

Design: 2 experiments each 2 randomised blocks of 24 plots.

Whole plot dimensions: 5.69 x 9.52. Area harvested: 0.00135.

Treatments:	LIFTER
One experiment with plots lifted by complete harvester	Complete
One experiment with plots lifted by elevator digger	Elevator
Treatments identical on both experiments	
Sources of King Edward seed tubers	SEEDSRCE
Healthy (ex Scotland) two plots per block	Healthy
Healthier (ex Rothamsted once-grown) two plots per block	Healthy+
Ten different certified stocks	CERT/1-CERT/10
Ten once-grown stocks	OG/1-OG/10

Basal applications: Manures: (13:13:20) at 1500 kg. Weedkillers: Linuron at 1.2 kg with paraquat at 0.4 kg ion in 450 l. Fungicide: Mancozeb at 1.3 kg in 370 l. Insecticide: Demeton-s-methyl at 0.25 kg applied with fungicide.

Cultivations, etc.:- Deep-tine cultivated: 7 Aug, 1972, twice 22 Aug, once 11 Sept. NPK applied: 23 Mar, 1973. Rotary cultivated, seed planted: 17 Apr. Weedkiller applied: 15 May. Grubbed: 8 June. Rotoridged: 12 June. Insecticide with fungicide applied: 2 July. Fungicide applied: 24 July, 9 Aug. Sprayed with undiluted BCV at 220 l: 18 Sept. Lifted: 11 Oct. Previous crops: Barley 1971, grass 1972.

NOTE: Emergence counts were made on 29 May. Counts were made of plant and stem numbers after burning off and before lifting. Tubers were graded into 6 sizes and assessments made of Oospora, Rhizoctonia, Helminthosporium and Phoma infection.

Standard errors per plot. Total tubers, tonnes/hectare.

LIFTER Complete:	3.20 or 6.9% (25 d.f.)
LIFTER Elevator:	1.94 or 4.5% (25 d.f.)
LIFTER Complete and Elevator:	2.56 or 5.7% (71 d.f.)

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73/R/P/3

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	LIFTER		
	Complete	Elevator	Mean
SEEDSRCE			
Healthy	49.7	47.3	48.5
Healthy+	52.4	46.4	49.4
Cert/1	45.3	43.4	44.3
Cert/2	44.0	37.5	40.7
Cert/3	45.9	42.3	44.1
Cert/4	45.8	43.2	44.5
Cert/5	45.4	43.3	44.4
Cert/6	49.8	44.6	47.2
Cert/7	45.1	44.0	44.6
Cert/8	42.5	41.8	42.2
Cert/9	47.8	42.4	45.1
Cert/10	42.9	44.1	43.5
OG/1	44.5	41.7	43.1
OG/2	50.4	44.9	47.6
OG/3	43.7	41.9	42.8
OG/4	45.0	40.8	42.9
OG/5	42.9	40.6	41.7
OG/6	49.2	43.5	46.3
OG/7	40.3	42.1	41.2
OG/8	46.4	44.6	45.5
OG/9	46.7	45.6	46.1
OG/10	49.4	46.1	47.7
Mean	46.6	43.6	45.1

STANDARD ERRORS OF DIFFERENCES

		SEEDSRCE LIFTER	
	SEEDSRCE	LIFTER	LIFTER Complete	LIFTER Elevator
Healthy v Healthy+	1.28		2.27	1.37
Healthy or Healthy+ v any of remainder	1.57		2.77	1.68
Between any of remainder	1.81		3.20	1.94

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73/R/P/3

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	LIFTER		
	Complete	Elevator	Mean
SEEDSRCE			
Healthy	79.4	80.5	79.9
Healthy+	76.5	73.9	75.2
Cert/1	77.1	75.9	76.5
Cert/2	77.4	75.5	76.4
Cert/3	64.2	69.0	66.6
Cert/4	78.7	80.2	79.4
Cert/5	80.3	81.1	80.7
Cert/6	80.2	82.3	81.2
Cert/7	75.9	77.9	76.9
Cert/8	77.7	76.9	77.3
Cert/9	76.3	81.7	79.0
Cert/10	80.4	79.6	80.0
OG/1	74.8	75.6	75.2
OG/2	75.5	76.5	76.0
OG/3	76.4	73.0	74.7
OG/4	70.5	73.2	71.8
OG/5	71.2	71.2	71.2
OG/6	79.4	80.0	79.7
OG/7	71.5	77.6	74.6
OG/8	79.3	77.1	78.2
OG/9	79.4	78.6	79.0
OG/10	74.5	78.1	76.3
Mean	76.3	77.1	76.7

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73/W/P/3 and 73/R/P/22

POTATOES

VARIETIES

Object: To study the yield and susceptibility to diseases of newer varieties of potatoes - Rothamsted (R) Little Knott I and Woburn (W) Horsepool.

Sponsors: J.R. Moffatt, G.A. Hide.

Design: Little Knott I (R): 4 blocks of 6 plots.
Horsepool (W): 4 blocks of 5 plots.

Whole plot dimensions:- Little Knott I (R): 2.84 x 12.2. Area harvested: 0.00173.
Horsepool (W): 2.84 x 15.2. Area harvested: 0.00217.

Treatments: Varieties and seed stocks:-

	VARIETY
Desiree, FS, Little Knott I (R) only	Desiree
King Edward, VTSC, Little Knott I (R) only	Edward
Maris Piper, FS, Horsepool (W) only	Piper
Pentland Crown, VTSC	Crown
Pentland Ivory, FS	Ivory
Stormont Enterprise ex N.I.A.B.	Entprise
Ulster Lancer ex N.I.A.B.	Lancer

NOTE: All varieties at Rothamsted received phorate at 0.56 kg, as granules, at planting.

Basal applications: Manures: Ground chalk at 7.5 tonnes, Little Knott I (R). (13:13:20) at 1500 kg, Little Knott I (R) and 1830 kg, Horsepool (W). Weedkillers: Paraquat at 0.56 kg ion in 280 l, Horsepool (W). Linuron at 1.2 kg plus paraquat at 0.7 kg ion in 450 l, Little Knott I (R). Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 280 l, Horsepool (W). Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 370 l, Little Knott I (R), in 390 l Horsepool (W). Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion, 370 l on the second occasion Horsepool (W), in 370 l on two occasions, Little Knott I (R).

Cultivations, etc.:- Little Knott I (R): Ground chalk applied: 23 Sept, 1972. Ploughed: 27 Sept. NPK applied, rotary cultivated: 29 Mar, 1973. Rotary cultivated, potatoes planted: 28 Apr. Weedkiller applied: 15 May. Grubbed: 12 June. Fungicide with insecticide applied: 2 July. Fungicide applied: 24 July, 9 Aug. Sprayed with undiluted BOV at 220 l: 20 Sept. Lifted: 5 Oct. Previous crops: Winter wheat 1971 and 1972.

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73/W/P/3 and 73/R/P/22

Horsepool (W): Paraquat applied: 2 Oct, 1972. Ploughed: 3 Jan, 1973. NPK applied: 26 Mar. Rotary cultivated and potatoes planted (only 2 rows of plots 15, 19, 20): 10 Apr. Remaining two rows on plots 15, 19, 20 planted: 18 Apr. Linuron with paraquat applied: 12 May. Grubbed: 6 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 25 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Lifted: 1 Oct. Previous crops: Barley 1971, beans 1972.

NOTE: Tubers were graded into six sizes. Incidence of Rhizoctonia solani and common scab were assessed after harvest.

Standard errors per plot. Total tubers, tonnes/hectare:
Little Knott I (R): 4.66 or 10.7% (15 d.f.)
Horsepool (W): 1.88 or 5.0% (12 d.f.)

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73/W/P/3 and 73/R/P/22

TABLES OF MEANS

LITTLE KNOTT I (R)

VARIETY

Desiree	Edward	Crown	Ivory	Entprise	Lancer	Mean
TOTAL TUBERS: TONNES/HECTARE						
39.8	48.6	50.7	39.0	41.6	42.2	43.6

STANDARD ERROR OF DIFFERENCES

VARIETY

3.29

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

82.0	82.3	95.4	82.6	89.0	80.2	85.2

HORSEPOOL (W)

VARIETY

Piper	Crown	Ivory	Entprise	Lancer	Mean
TOTAL TUBERS: TONNES/HECTARE					
41.9	43.5	32.6	33.4	36.6	37.6

STANDARD ERROR OF DIFFERENCES

VARIETY

1.33

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

81.1	82.9	86.1	61.8	69.1	76.2

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73/R/P/4

POTATOES

SPACING AND FERTILISER

Object: To study the effects of different spacings within and between rows and of fertiliser rates on yields and size grades of two potato varieties - Stackyard.

Sponsors: G.A. Hide, J.R. Moffatt, F.V. Widdowson.

Design: 3 randomised blocks of 24 plots.

Whole plot dimensions: Narrow rows 2.84 x 15.2
Wide rows 3.66 x 15.2
Plot area harvested: Narrow rows 0.00217
Wide rows 0.00279

Treatments: All combinations of:

1. Varieties:

	VARIETY
King Edward	Edward
Pentland Crown	Crown

2. Compound fertiliser (13:13:20) kg:

	FERT
1510	1510
3020	3020

3. Row spacing cm:

	ROWSPACE
71 (28 inches)	71
91 (36 inches)	91

4. Number of plants per hectare:

	PLANT/HA
37100 (by spacing seed at 38 cm on rows 71 cm apart, 30 cm on rows 91 cm apart)	37100
29700 (seed 48 cm on 71 cm rows, 38 cm on 91 cm rows)	29700
22200 (seed 61 cm on 71 cm rows, 48 cm on 91 cm rows)	22200

Basal applications: Weedkillers: Linuron at 1.2 kg with paraquat at 0.4 kg ion in 450 l. Fungicide: Mancozeb at 1.3 kg in 430 l on narrow rows and in 340 l on wide rows. Insecticide: Demeton-s-methyl at 0.25 kg applied with the fungicide.

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73/R/P/4

Cultivations, etc.:- Ploughed: 4 Nov, 1972. Fertiliser treatments applied: 27 Mar, 1973. Rotary cultivated and seed planted: 18 Apr. Weedkiller applied: 18 May. Grubbed and ridged: 12 June. Insecticide with fungicide applied: 5 July. Fungicide applied: 24 July, 16 Aug. Sprayed with undiluted PCV at 220 l: 20 Sept. Lifted: 22 Oct. Previous crops: Wheat 1971, Fallow 1972.

NOTE: Counts were made of plant and stem numbers after burning off and before lifting. Tubers were graded into 6 sizes.

Standard error per plot.
Total tubers, tonnes/hectare: 2.49 or 4.5% (46 d.f.)

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TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	FERT		ROWSPACE		PLANT/HA			
	1510	3020	71	91	37100	29700	22200	Mean
VARIETY								
Edward	48.9	50.9	51.9	47.9	49.9	50.6	49.2	49.9
Crown	58.6	64.0	62.9	59.7	62.6	60.6	60.6	61.3
		FERT						
		1510	55.3	52.2	55.0	53.1	53.1	53.8
		3020	59.5	55.3	57.5	58.1	56.7	57.4
				ROWSPACE				
				71	57.5	57.8	56.9	57.4
				91	55.0	53.4	52.9	53.8
Mean					56.3	55.6	54.9	55.6

	ROWSPACE	71			91		
	PLANT/HA	37100	29700	22200	37100	29700	22200
VARIETY	FERT						
Edward	1510	51.6	50.7	50.2	48.1	46.8	45.9
Edward	3020	53.1	53.8	52.0	46.7	51.1	48.6
Crown	1510	60.1	60.1	58.9	60.4	54.7	57.4
Crown	3020	65.3	66.5	66.4	64.7	61.1	59.6

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73/P/P/4

TOTAL TUBERS: TONNES/HECTARE

STANDARD ERRORS OF DIFFERENCES

VARIETY	FERT	ROWSPACE	PLANT/HA	VARIETY FERT	VARIETY ROWSPACE	FERT ROWSPACE
0.59	0.59	0.59	0.72	0.83	0.83	0.83

VARIETY PLANT/HA	FERT PLANT/HA	ROWSPACE PLANT/HA	VARIETY FERT ROWSPACE PLANT/HA
1.02	1.02	1.02	2.03

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73/R/P/4

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	FERT		ROWSPACE		PLANT/HA			Mean
	1510	3020	71	91	37100	29700	22200	
VARIETY								
Edward	74.9	78.2	76.5	76.5	73.6	76.2	79.6	76.5
Crown	93.7	93.2	93.5	93.4	93.4	93.5	93.5	93.4
		FERT						
		1510	84.0	84.6	82.8	83.7	86.4	84.3
		3020	86.0	85.3	84.2	86.0	86.8	85.7
				ROWSPACE				
				71	83.8	84.5	86.7	85.0
				91	83.2	85.2	86.4	85.0
Mean					83.5	84.8	86.6	85.0

	ROWSPACE	71			91	
	PLANT/HA	37100	29700	22200	37100	29700	22200
VARIETY	FERT						
Edward	1510	71.0	72.9	78.9	73.2	74.3	78.8
Edward	3020	76.9	78.7	80.6	73.5	78.9	80.3
Crown	1510	93.5	93.3	94.3	93.4	94.3	93.6
Crown	3020	93.7	92.9	93.1	92.9	93.3	93.1

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73/W/P/4

POTATOES

SOIL FUNGICIDES AND SCAB CONTROL

Object: To study the effects of a range of fungicides on yield and common scab of potatoes - Woburn Great Hill Bottom I.

Sponsor: A.H. McIntosh.

Design: 4 blocks of 5 plots.

Whole plot dimensions: 2.85 x 6.10. Area harvested: 0.00087.

Treatments: Fungicides (applied to soil at 78 kg):

	FUNGCIDE
None	O
Catechol	CA
Chlorohydroquinone	CH
Hydroquinone	HY
Quintozene	QU

Basal applications: (13:13:20) at 1830 kg. Weedkiller: Linuron at 1.8 kg plus paraquat at 0.42 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and 370 l on the second occasion.

Variety: Maris Piper.

Cultivations, etc.:- Deep-tine cultivated twice: 9 Oct, 1972, 16 Oct. NPK applied: 27 Mar, 1973. Treatment fungicide applied, all plots rotary cultivated, potatoes planted: 10 Apr. Weedkiller applied: 14 May. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 12 Sept. Lifted: 14 Sept. Previous crops: Barley 1971, beans 1972.

NOTE: Tuber samples were taken at harvest for assessment of scab.

Standard error per plot.
Total tubers, tonnes/hectare: 3.83 or 8.5% (12 d.f.)

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TABLES OF MEANS

FUNGCIDE

O	CA	CH	HY	QU	Mean
		TOTAL TUBERS: TONNES/HECTARE			
45.4	44.4	44.2	41.8	49.6	45.1

STANDARD ERROR OF DIFFERENCES

FUNGCIDE

2.71

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

95.9	95.5	95.2	94.9	96.1	95.5

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73/R/P/8

POTATOES

APHIDS AND TOP-ROLL

Object: To study the relationship between aphids and the appearance of top-roll in three potato varieties and to measure their effects on yields and quality of produce - Little Hoos.

Sponsor: R.W. Gibson.

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 3.56 x 6.10. Area harvested: 0.00130.

Treatments: All combinations of:-

1. Aphid infestation	APHID
None, aphids controlled by insecticide - phorate at 1.7 kg applied as granules at planting	None
Natural colonisation (2 plots/block)	Natural
2. Varieties	VARIETY
King Edward	Edward
Majestic	Majestic
Pentland Crown	Crown

Basal applications: Manures: (13:13:20) at 1500 kg. Weedkillers: Linuron at 1.8 kg with paraquat at 0.8 kg ion in 430 l. Fungicide: Mancozeb at 1.3 kg in 430 l.

Cultivations, etc.:- Deep-tine cultivated: 7 Aug, 1972, twice 22 Aug, once 11 Sept. NPK applied: 23 Mar, 1973. Rotary cultivated: 16 Apr. Ridged and hand planted: 17 Apr. Rotoridged: 27 Apr. Weedkiller applied: 15 May. Fungicide applied 10, 25 July. Haulm mechanically destroyed: 17 Sept. Sprayed with undiluted BOV at 220 l: 18 Sept. Lifted: 12 Oct. Previous crops: Barley 1971, grass 1972.

NOTE: Aphid counts and assessments of top-roll were made at weekly intervals during June and July.

Standard error per plot.
Total tubers, tonnes/hectare: 2.56 or 5.1% (27 d.f.)

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73/R/P/8

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	VARIETY			
	Edward	Majestic	Crown	Mean
APHID				
None	50.0	52.4	46.5	49.6
Natural	47.9	51.8	49.4	49.7
Mean	48.6	52.0	48.4	49.7

STANDARD ERRORS OF DIFFERENCES

	APHID	VARIETY	APHID VARIETY
APHID	0.90	1.04	
None			1.81
Natural			1.28
None v Natural			1.56

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

	VARIETY			
	Edward	Majestic	Crown	Mean
APHID				
None	83.6	82.8	94.9	87.1
Natural	81.0	82.0	93.1	85.4
Mean	81.9	82.3	93.7	85.9

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73/R/SB/1

SUGAR BEET

SYNTHETIC PYRETHROID

Object: To study the control of aphids on sugar beet by a new, more persistent pyrethroid, NRDC143 - West Barnfield I.

Sponsors: J.H. Stevenson, I.J. Graham-Bryce, N.F. Janes.

Design: 5 randomised blocks of 4 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00097.

Treatments: Insecticidal sprays (a.i., applied in 340 l.) INSCTCDE

None	0
Demeton-s-methyl at 0.24 kg	DSM
Synthetic pyrethroid, NRDC143 as a single spray at 0.56 kg	PYS
Synthetic pyrethroid, NRDC143 as two sprays, each at 0.56 kg	PYR

All treatments applied on 12 July; second application of NRDC143 (PYR) on 30 July.

Basal applications: Manures: (20:15:15) at 750 kg.

Seed: Klein E, sown at 7.8 kg.

Cultivations, etc.:- Ploughed: 27 Nov, 1972. Fertiliser applied, power harrowed: 21 Mar, 1973. Seed sown: 22 Mar. Singled: 30 May. Tractor hoed: 6 June, 4 July. Lifted: 19 Nov.

NOTE: Estimates of aphid (Aphis fabae) infection were made before and for a month after insecticides applied. An assessment of the number of plants affected by sugar beet yellowing viruses was made in the autumn.

Standard errors per plot.
Roots (washed), tonnes/hectare: 3.74 or 9.7% (12 d.f.)
Total sugar, tonnes/hectare: 0.662 or 10.4% (12 d.f.)

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73/R/SB/1

TABLES OF MEANS

ROOTS (WASHED): TONNES/HECTARE

INSCTCDE

0	DSM	PYS	PYR	Mean
39.0	39.3	37.3	39.3	38.7

STANDARD ERROR OF DIFFERENCES

INSCTCDE

2.37

SUGAR%

16.8	16.6	16.2	16.3	16.5

TOTAL SUGAR: TONNES/HECTARE

6.55	6.52	6.05	6.41	6.38

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.419

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73/R/M/4

MAIZE AND SWEET CORN

CONTROL OF FRIT FLY

Object: To compare two insecticides and times and methods of application on incidence of frit fly (Oscinella frit) and yield of maize and sweet corn - Long Hoos IV 6.

Sponsors: J.C. Wilson, R. Bardner, K.E. Fletcher.

Design: 3 randomised blocks of 4 plots split into 4.

Whole plot dimensions: 3.66 x 24.7. Sub plot area harvested: 0.00134.

Treatments: All combinations of:-

Whole plots:	1. Crop:	CROP
	Grain maize, Pioneer 131	Maize
	Sweet corn, Early King	Sweetcrn
	2. Phorate (1.68 kg) as granules:	PHORATE
	None	None
	Seedbed	Seedbed
Sub plots:	3. Dimethoate (0.67 kg) foliar spray:	DIMETH
	None	None
	Early, at 2-leaf stage	Early
	Late, when frit fly damage apparent	Late
	Combined early and late sprays	Earlylat

Phorate was applied as granules drilled with the seed. Dimethoate was applied as a spray in 290 l.

Basal applications: Manures: Ground chalk at 7.5 tonnes. (25:10:10) at 690 kg. Weedkiller: Atrazine at 1.7 kg in 290 l.

Seed: Precision drilled at 11,000 seeds per hectare.

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Cultivations, etc.:- Chalk applied: 25 Sept, 1972. Ploughed: 26 Sept. NPK applied: 2 May, 1973. Power harrowed: 3 May. Seed sown: 11 May. Dimethoate applied: early 14 June, late 3 July. Sweet corn harvested: 31 Aug. Maize harvested: 9 Nov. Previous crops: Barley 1971, winter wheat 1972.

NOTES: (1) Observations on incidence of frit fly larvae (Oscinella frit) were made in spring and on adult populations throughout the season.

(2) Maize. Yields of two plots PHORATE-Seedbed DIMETH-Late and Earlylat were not taken because of the failure of the seed drill. Estimated values were used in the analysis.

ERRATUM: The similar experiment reported in 1972 (72/R/M/5) showed the rate of dimethoate as 1.68 kg. This should have been 0.67 kg.

Standard errors per sub plot.

Maize: Grain, tonnes/hectare:	0.380 or 5.8% (10 d.f.)
Sweet corn: Total saleable cobs, tonnes/hectare:	0.620 or 9.1% (12 d.f.)
No. of saleable cobs, thousands/hectare:	3.82 or 10.0% (12 d.f.)

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73/R/M/4

TABLES OF MEANS

CROP

Maize

GRAIN: TONNES/HECTARE

DIMETH

	None	Early	Late	Earlylat	Mean
PHORATE					
None	6.48	6.61	6.72	6.45	6.57
Seedbed	6.64	6.71	6.29	6.97	6.65
Mean	6.56	6.66	6.50	6.71	6.61

STANDARD ERRORS OF DIFFERENCES

DIMETH	PHORATE* DIMETH
0.220	0.311

* Within the same level of PHORATE only

Mean D.M. % 61.9

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73/R/M/4

CROP

Sweetcrn

TOTAL SALEABLE COBS: TONNES/HECTARE

DIMETH

	None	Early	Late	Earlylat	Mean
PHORATE					
None	3.70	5.66	4.01	5.28	4.66
Seedbed	8.60	8.71	9.47	8.95	8.93
Mean	6.15	7.18	6.74	7.11	6.80

STANDARD ERRORS OF DIFFERENCES

DIMETH	PHORATE* DIMETH
0.358	0.506

* Within the same level of PHORATE only

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73/R/M/4

CROP

Sweetcrn

NUMBER OF SALEABLE COBS: THOUSANDS/HECTARE

	DIMETH				
	None	Early	Late	Earlylat	Mean
PHORATE					
None	21.7	33.4	23.7	31.4	27.5
Seedbed	47.6	46.6	51.3	48.8	48.6
Mean	34.6	40.0	37.5	40.1	38.1

STANDARD ERRORS OF DIFFERENCES

DIMETH	PHORATE* DIMETH
2.21	3.12

* Within the same level of PHORATE Only

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METEOROLOGICAL RECORDS 1973 - ROTHAMSTED

(Departure from long-period means in brackets)

Month	Total sunshine: hours	Mean temperature: °C Air(1)	Dew point	In ground 30cm	In ground 100cm	Ground(2) frosts	Total rainfall:mm 0.0004 ha (1/1000 acre) gauge	Rain(3) days	Drainage through 50.8 cm (20 in) soil:mm	Wind(4) miles per hour
Jan	30.7 (-21.0)	3.7 (+0.8)	2.3	4.9	6.6	15	22 (-42)	17	15.0	4.6
Feb	73.4 (+ 5.6)	3.7 (+0.3)	1.5	4.6	6.1	21	24 (-25)	13	9.1	6.1
Mar	138.6 (+22.4)	5.7 (+0.5)	3.1	5.5	5.9	20	14 (-34)	8	3.0	4.9
Apr	141.1 (-10.2)	6.9 (-0.8)	2.6	7.2	6.9	17	62 (+13)	13	15.0	6.8
May	181.8 (-12.4)	11.5 (-0.4)	7.4	10.9	8.9	5	58 (+ 4)	15	16.5	5.8
June	257.6 (+56.0)	14.9 (+0.8)	9.7	14.8	12.2	1	86 (+29)	6	44.2	4.1
July	165.5 (-25.2)	15.5 (-0.4)	12.0	16.3	14.3	0	57 (- 7)	11	17.0	3.5
Aug	197.6 (+18.8)	17.0 (+1.4)	13.0	16.4	14.9	0	43 (-22)	6	7.6	4.4
Sept	169.2 (+25.2)	14.7 (+1.3)	10.8	14.9	14.7	2	66 (+ 6)	13	26.4	4.9
Oct	107.8 (+ 4.5)	8.9 (-0.7)	6.8	11.2	12.7	12	33 (-41)	10	8.4	4.8
Nov	96.9 (+35.6)	5.3 (-0.5)	2.6	7.6	10.1	18	26 (-46)	13	3.8	5.7
Dec	57.2 (+12.5)	4.6 (+1.0)	2.7	5.0	7.3	17	49 (-17)	19	41.9	6.3
Year*	1617.4 (+111.8)	9.4 (+0.3)	6.2	9.9	10.1	128	540 (-182)	144	207.9	5.1

(1) Mean of maximum and minimum
(2) Number of nights grass min. was below 0.0°C
(3) Number of days rainfall was 0.2 mm or more
(4) At 2 metres above ground level

* Mean or total

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73/E/1

METEOROLOGICAL RECORDS 1973 - WOBURN

(Departure from long-period means in brackets)

Month	Total sunshine: hours	Mean temperature: °C Air(1)	Dew point	In ground 30cm	In ground 100cm	Ground(2) frosts	Total rainfall: mm 12.7 cm (5 in) gauge	Rain(3) days	Wind(4) miles per hour
Jan	39.5 (-11.6)	4.1 (+1.0)	2.6	4.9	7.0	13	20 (-35)	13	4.7
Feb	75.0 (+ 9.0)	3.8 (+0.5)	1.8	4.7	6.5	19	19 (-21)	11	6.0
Mar	129.2 (+11.6)	5.5 (+0.1)	3.0	5.6	6.2	25	11 (-31)	5	4.2
Apr	146.4 (+ 3.6)	6.9 (-1.2)	3.2	7.3	7.0	18	46 (+ 1)	13	5.3
May	177.7 (- 6.4)	11.1 (0.0)	7.9	11.4	9.1	1	111 (+58)	14	5.3
June	250.0 (+53.0)	14.6 (+0.3)	10.3	15.9	12.5	2	71 (+22)	5	3.7
July	143.7 (-36.6)	15.5 (-0.5)	12.0	16.7	14.4	0	37 (-19)	9	3.3
Aug	178.6 (+ 8.0)	16.5 (+0.7)	13.3	17.1	15.1	0	32 (-29)	7	4.0
Sept	139.3 (+ 4.5)	14.5 (-0.9)	11.1	15.2	14.8	2	36 (-15)	10	4.3
Oct	95.8 (- 6.7)	8.7 (-1.4)	6.9	10.7	12.7	13	30 (-24)	11	3.8
Nov	85.7 (+25.6)	5.4 (-0.9)	3.0	7.1	10.1	15	32 (-32)	6	5.6
Dec	53.1 (+ 8.8)	4.6 (+0.7)	2.9	4.5	7.3	17	32 (-20)	15	6.2
Year*	1514.0 (+62.8)	9.3 (0.0)	6.5	10.1	10.2	125	477 (-145)	119	4.7

(1) Mean of maximum and minimum
(2) Number of nights grass min. was below 0.0°C
(3) Number of days rainfall was 0.2 mm or more
(4) At 2 metres above ground level

* Mean or total

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METEOROLOGICAL RECORDS 1973 - SAXMUNDHAM

Month	Mean temperature: °C Air(1)	Dew point	In ground under bare soil 30 cm	Ground(2) frosts	Total rainfall: mm 12.7 cm (5 in) gauge	Rain(3) days	Wind(4) miles per hour
Jan	4.4	2.8	4.8	2+	17	8	4.4
Feb	3.8	1.7	4.0	15	28	12	7.0
Mar	6.2	3.3	5.7	19	13	6	5.7
Apr	6.4	3.3	6.9	12	62	10	7.7
May	10.8	8.3	11.5	3	62	15	6.1
June	14.5	11.1	17.1	1	25	4	4.2
July	15.5	11.7	18.5	0	73	11	3.8
Aug	16.8	13.3	17.8	0	26	8+	4.3
Sept	14.5	11.7	15.7	0	86	11	5.2
Oct	9.3	6.8	10.5	8	39	8	4.8
Nov	5.0	3.3	6.0	13	28	5	7.4
Dec	4.4	3.9	4.4	11	35	9	7.5
Year*	9.3	6.8	10.2	91+	494	107+	5.7

(1) Mean of maximum and minimum
(2) Number of nights grass min. was below 0.0°C
(3) Number of days rainfall was 0.2 mm or more
(4) At 2 metres above ground level

* Mean or total

\+ Based on available daily observations i.e. these figures minimal

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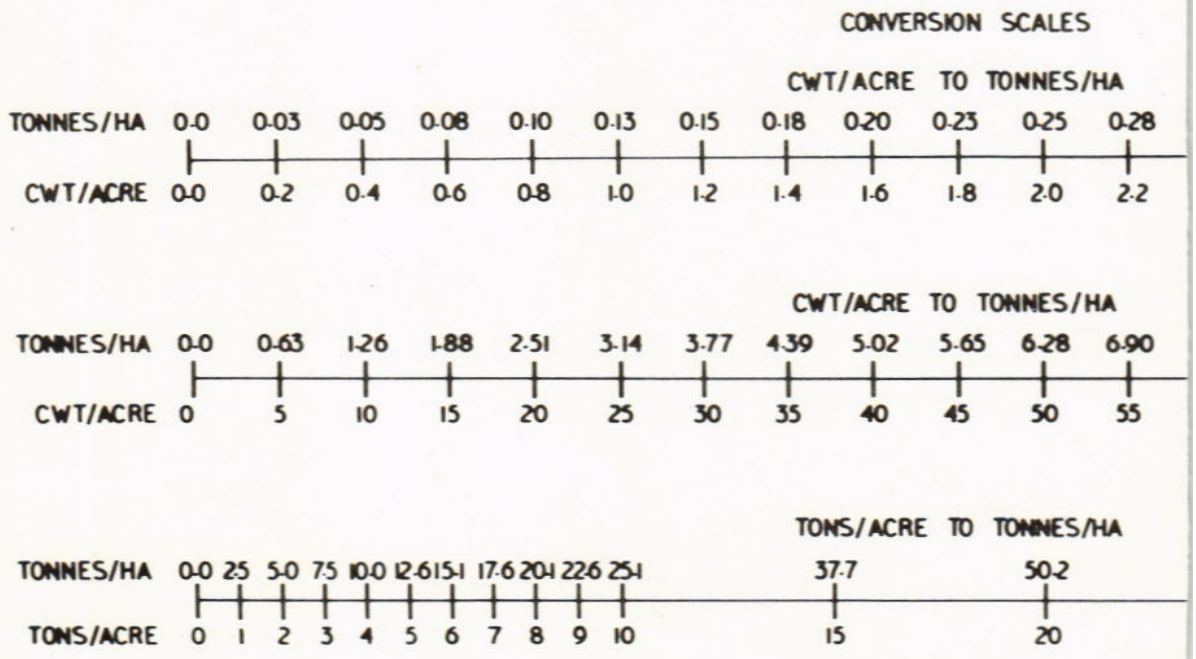
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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (sq yd)	= 0·8361 sq m
1 acre (=4840 sq yd)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes)
1 pint	= 0·5682 litre
1 gallon (gal) (=8 pints)	= 4·546 litre
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litre

To convert	*Multiply by*
oz/acre to g/ha	70·06
lb/acre to kg/ha	1·121
cwt/acre to kg/ha	125·5
cwt/acre to tonnes/ha	0·1255
tons/acre to kg/ha	2511
tons/acre to tonnes/ha	2·511
gal/acre to litre/ha	11·23



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Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (sq m)	=	1·196 square yards (sq yd)
1 hectare (ha)	=	2·471 acres
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)
1 litre = 1000 millilitres (ml)	=	35·20 fluid ounces = 0·03531 cubic foot

To convert	*Multiply by*
g/ha to oz/acre	0·01427
kg/ha to lb/acre	0·8921
kg/ha to cwt/acre	0·007966
tonnes/ha to cwt/acre	7·966
kg/ha to tons/acre	0·0003983
tonnes/ha to tons/acre	0·3983
litre/ha to gal/acre	0·08902

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0·5556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

