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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1972



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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

YIELDS

of the

FIELD

EXPERIMENTS

1972

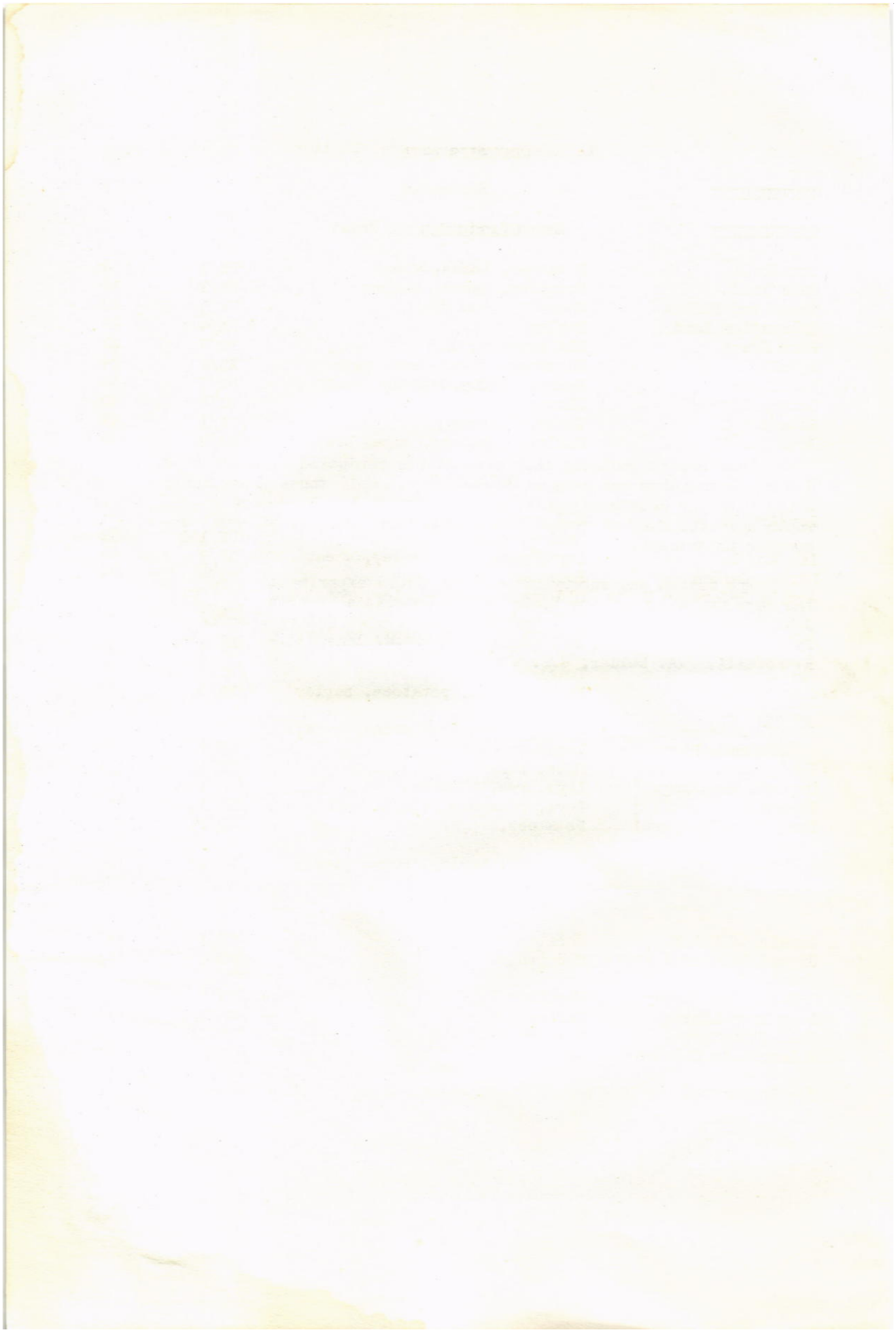
This report includes only experiments conducted at Rothamsted, Woburn, Saxmundham and some at Brooms Barn. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

The design and supervision of the field experiments are the responsibility of the Field Plots Committee (members in 1972: G.W. Cooke (Chairman), G.V. Dyke (Secretary), J. McEwen (Deputy Secretary), J.M. Hirst, A.E. Johnston, F.G.W. Jones, J.R. Moffatt, R. Moffitt, J.A. Nelder, C.P. Whittingham).

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

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CONVENTIONS 1972

In this report 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.

For each experiment, other than annuals, references are given for previous years. These refer to the '(Numerical) Results 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 with full title 'Details of the Classical and Long Term Experiments up to 1967'.

'Nitro-Chalk' refers to the grade containing 21% 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.

Treatment symbols are used in many summaries of results, and for short-term experiments the key is given with the treatment descriptions.

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For the classical and some long-term experiments the full description of the treatments up to 1967 was given in the 'Details': modifications are given whenever treatments change. For other long-term experiments the key is given in the first year of the experiment with modifications as they arise.

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 7 in. apart (the most common arrangment), 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. fallow paths made after the crop has established.

The 'Area harvested' in the 'Results', 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. 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.

Standard errors

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

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72/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 129th year, wheat, potatoes, beans. The fifth year of 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 69-71/R/BK/1.

Areas harvested:

Wheat:	Section 0	0.00434
	Section 1	0.00798
	Sections 2, 3 and 6	0.00659
	Section 9	0.00694
Potatoes:	Section 4	0.00659
Beans:	Section 7	0.00618

Section 8 (continuous wheat without weedkillers) was fallowed in 1972.

Standard applications:-

Winter wheat: Weedkillers: Aminotriazole at 4.5 kg plus ammonium thiocyanate at 4.2 kg in 220 l (not applied to Section 6, first wheat crop after fallow). Terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l). MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Potatoes: Weedkillers: Aminotriazole at 4.5 kg plus ammonium thiocyanate at 4.2 kg in 220 l. Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 440 l. Fungicide: Mancozeb at 1.4 kg in 440 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the mancozeb on the second occasion.

Spring beans: Insecticides: Phorate at 1.1 kg applied as granules. Demeton-s-methyl at 0.25 kg in 440 l applied to ends of plots.

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

Cultivations, etc.:-

ALL SECTIONS: Autumn fertilisers applied: 21 Sept, 1971. FYM applied: 29 Sept. Ploughed: 30 Sept.

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CROPPED SECTIONS:
Winter wheat: Aminotriazole and ammonium thiocyanate applied: 10 Sept, 1971. Seed drilled: 22 Oct. 'Prebane' applied: 25 Oct. N applied: 18 Apr, 1972. MCPA/mecoprop/dicamba applied: 27 Apr. Combine harvested: 1 Sept.
Potatoes: Aminotriazole and ammonium thiocyanate applied: 10 Sept, 1971. N applied: 18 Apr, 1972. Plots rotary cultivated, potatoes machine planted: 19 Apr. Sprayed with linuron and paraquat: 17 May. Grubbed: 14 June. Rotary ridged: 15 June - 24 June. Fungicide applied: 12 July, 21 July, 10 Aug. Insecticide applied: 21 July. Sprayed with undiluted BOV at 150 l: 16 Sept. Lifted: 28 Sept.
Spring beans: N applied, seed drilled: 16 Mar, 1972. Phorate applied: 17 June. Demeton-s-methyl applied: 5 Aug. Combine harvested: 27 Sept.
FALLOW SECTIONS: Aminotriazole and ammonium thiocyanate applied to Section 5: 10 Sept, 1971. Ploughed second time: 12 - 14 May, third time: 10 July.
BROADBALK WILDERNESS:
Ungrazed meadow (north): Topped with rotary grass cutter: 17 Nov, 1972.
Grazed meadow (centre): Grazed by sheep: 5 - 25 May, 1971. 9 June - 16 June, 30 June - 7 July, 20 July - 28 July, 15 Aug - 24 Aug, 11 Sept - 15 Sept. Grass topped: 25 May, 16 June, 7 July, 28 July, 24 Aug, 15 Sept.

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72/R/BK/1

TABLES OF MEANS

WHEAT

GRAIN: TONNES/HECTARE

Section	6	3	2	1	9	0	
Years after fallow	1	2	**	6	14	21	Mean
Plot							
01	6.72	6.81	6.51				
21	6.87	7.34	6.94	7.24	6.75	3.85	6.50
22	7.60	6.09	8.02	6.82	6.73	6.29	6.92
03	3.11	1.22	3.37	1.76	1.48	1.63	2.09
05	4.03	1.86	4.24	1.68	1.85	2.08	2.62
06	5.56	4.03	6.22	4.15	4.24	4.74	4.82
07	6.42	5.02	6.61	5.30	5.22	5.31	5.65
08	5.61	6.42	6.52	5.46	6.44	4.96	5.90
09	6.05	6.10	6.00	5.86	6.18	5.06	5.88
10	3.59	4.41	5.81	4.87	3.34	3.16	4.20
11	5.17	5.26	6.64	4.89	3.65	4.07	4.95
12	5.51	5.50	6.58	5.65	4.99	5.89	5.69
13	5.96	5.49	6.83	5.43	5.12	5.12	5.66
14	6.06	5.73	6.83	5.81	5.69	5.46	5.93
15	6.18	5.91	6.90	6.09	5.65	5.29	6.00
16	5.59	5.05	6.37	5.46	5.13	5.07	5.45
17	6.13	5.34	7.04	5.25	4.93	5.13	5.64
18	6.37	5.08	6.94	5.53	5.41	5.20	5.76
19	7.01	4.55	6.21	4.55	4.22	4.63	5.19
20				4.51		3.48	

Mean D.M. %: 84.4

** After beans

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72/R/BK/1

WHEAT

STRAW: TONNES/HECTARE

Section	6	3	2	1	9	0	
Years after fallow	1	2	**	6	14	21	Mean
Plot							
01	6.35	9.14	9.09				
21	7.88	10.58	11.26	10.33	7.24	8.89	9.37
22	6.88	7.13	10.97	9.25	6.48	8.34	8.18
03	1.41	1.38	2.71	1.83	1.11	2.00	1.74
05	2.30	1.93	4.08	1.91	1.45	2.23	2.32
06	4.15	4.33	6.07	3.95	3.19	4.34	4.34
07	5.84	5.42	6.90	5.88	4.96	5.87	5.81
08	5.12	6.71	8.26	7.20	6.03	6.64	6.66
09	5.46	7.73	8.91	7.51	6.07	7.24	7.15
10	2.17	3.25	4.09	3.60	1.99	3.20	3.05
11	3.72	4.04	4.60	4.61	2.71	4.22	3.98
12	4.19	4.90	6.01	4.82	3.63	5.15	4.78
13	4.97	4.63	6.31	4.87	4.50	4.84	5.02
14	5.72	4.59	5.52	4.72	4.20	5.36	5.02
15	5.45	5.63	5.85	5.04	4.91	4.77	5.27
16	4.84	4.52	5.19	4.48	4.59	4.20	4.64
17	5.40	5.05	5.54	3.79	4.59	3.87	4.71
18	5.87	4.28	6.52	3.97	4.55	3.81	4.83
19	5.43	3.46	4.54	3.49	3.41	3.09	3.90
20				3.03		3.03	

Mean D.M. %: 80.5

** After beans

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Section 7 4

Plot	SPRING BEANS GRAIN: TONNES/ HECTARE	SPRING BEANS STRAW: TONNES/ HECTARE	POTATOES TOTAL TUBERS: TONNES/ HECTARE	POTATOES % WARE 3.81 CM (1.5 INCH) RIDDLE
01	3.39	3.26	35.0	91.9
21	3.95	3.94	41.4	85.9
22	3.63	3.39	40.2	87.2
03	2.48	1.09	10.8	76.2
05	3.58	2.37	16.2	68.5
06	3.19	3.06	23.7	75.9
07	3.51	3.01	26.4	78.2
08	4.07	3.23	35.5	83.9
09	4.18	3.42	38.8	91.8
10	2.83	1.16	8.1	69.3
11	1.24	0.98	6.6	35.7
12	1.37	1.82	9.7	47.8
13	3.48	3.63	22.3	80.9
14	3.99	3.11	22.6	77.0
15	3.50	3.51	38.6	88.1
16	4.17	3.83	32.7	85.8
17	4.12	3.92	28.0	88.9
18	4.39	4.07	27.8	88.9
19	2.90	2.57	17.5	84.5
Mean D.M. %:	80.7	40.0		

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72/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 121st year, potatoes, beans, barley. The 5th year of revised scheme.

For previous years see 'Details' 1967, Station Report for 1966, 68/A/2(t), 69/R/HB/2(t) and 70-71/R/HB/2.

Standard applications:
Potatoes: Weedkillers: Paraquat at 0.56 kg ion in 220 l. Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 440 l. Fungicide: Mancozeb at 1.4 kg in 440 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the mancozeb on the second occasion.
Spring beans: Insecticide: Phorate at 1.1 kg applied as granules.
Barley: Paraquat at 0.56 kg ion in 220 l. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

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

Cultivations, etc.: Fertilisers, except N, applied: 22 Sept, 1971.
FYM applied: 5 Nov. Ploughed: 6 Nov. N applied: 17 Apr, 1972.
Potatoes: Paraquat applied: 9 Sept, 1971. Plots rotary cultivated, potatoes machine planted: 19 Apr, 1972. Linuron plus paraquat applied: 17 May. Grubbed: 14 June. Rotary ridged: 15 June. Fungicide applied: 11 July, 21 July, 10 Aug. Insecticide applied: 21 July. Sprayed with undiluted BOV at 110 l: 16 Sept, and at 200 l: 20 Sept. Lifted: 28 Sept.
Spring beans: Seed drilled: 16 Mar, 1972. Insecticide applied: 17 June. Combine harvested: 27 Sept.
Barley: Paraquat applied: 9 Sept, 1971. Seed drilled: 15 Mar, 1972. 'Banlene Plus' applied: 18 May. Combine harvested: 23 Aug.

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72/R/HB/2

TABLES OF MEANS

BARLEY

N: KG/HA

Treatment** 1852-1972	Treatment** 1852-1966	0	48	96	144	Mean
		GRAIN: TONNES/HECTARE				
-	-	1.81	3.15	3.84	4.34	3.29
-	N	2.02	3.08	3.42	3.86	3.10
P	-	2.07	3.78	4.82	4.89	3.89
P	N	2.43	3.69	4.38	3.65	3.54
K Na Mg	-	0.64	3.69	4.83	5.64	3.70
K Na Mg	N	1.80	3.38	3.54	4.33	3.26
P K Na Mg	-	0.94	3.78	5.52	6.34	4.15
P K Na Mg	N	2.17	4.12	5.89	6.61	4.70
D	-	6.11	6.79	6.25	6.13	6.32
(D)	-	1.18	4.07	6.24	6.25	4.43
(Ashes)	-	1.25	4.18	4.63	5.47	3.88
-	-	0.96	2.88	3.73	4.63	3.05
		STRAW: TONNES/HECTARE				
-	-	0.74	1.64	2.16	2.14	1.67
-	N	0.75	1.53	1.65	1.86	1.45
P	-	0.76	1.48	2.76	2.84	1.96
P	N	0.97	1.90	2.63	2.25	1.94
K Na Mg	-	0.18	1.95	2.90	3.94	2.24
K Na Mg	N	0.88	2.04	2.10	2.41	1.86
P K Na Mg	-	0.34	1.94	3.45	4.79	2.63
P K Na Mg	N	0.86	2.18	3.43	5.03	2.87
D	-	3.51	5.19	4.63	6.20	4.88
(D)	-	0.46	2.27	3.81	4.03	2.64
(Ashes)	-	0.48	1.94	2.50	3.20	2.03
-	-	0.46	1.38	2.09	2.36	1.58

** For explanation of symbols see 'Details' 1967

Mean D.M. % (all plots): Grain: 84.7
Straw: 87.0

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72/R/HB/2

BARLEY

N: KG/HA

Treatment**			0	48	96	144	Mean
			GRAIN: TONNES/HECTARE				
1852-1972	1852-1966						
-		N*	2.33	3.18	3.88	3.65	3.26
	Si	N*	2.43	4.23	5.92	5.06	4.41
P		N*	2.76	4.59	5.61	5.88	4.71
P	Si	N*	2.52	4.73	5.39	6.05	4.67
K Na Mg		N*	2.02	3.60	4.25	4.51	3.59
K Na Mg	Si	N*	2.63	4.19	5.60	6.20	4.66
P K Na Mg		N*	2.26	4.35	6.15	6.46	4.81
P K Na Mg	Si	N*	2.37	5.06	6.08	6.25	4.94
-		R(c)	2.49	4.33	5.75	6.95	4.88
-		R(r)	4.21	4.50	6.09	7.15	5.49
P		R(c)	2.76	4.57	5.55	6.32	4.80
P		R(r)	3.91	5.29	6.59	6.88	5.67
K Na Mg		R(c)	2.47	4.32	6.24	6.90	4.98
K Na Mg		R(r)	3.22	4.73	6.08	6.85	5.22
P K Na Mg		R(c)	2.74	4.45	6.48	6.58	5.06
P K Na Mg		R(r)	4.45	6.08	7.03	6.96	6.13
			STRAW: TONNES/HECTARE				
-		N*	0.96	0.67	2.01	2.00	1.41
	Si	N*	0.93	2.32	3.33	3.01	2.40
P		N*	1.02	2.40	3.15	3.49	2.51
P	Si	N*	0.96	2.67	3.41	3.98	2.75
K Na Mg		N*	0.64	1.94	2.37	3.16	2.03
K Na Mg	Si	N*	1.22	2.55	3.60	4.60	2.99
P K Na Mg		N*	0.97	2.32	4.01	5.54	3.21
P K Na Mg	Si	N*	0.92	3.27	3.87	4.99	3.26
-		R(c)	0.94	1.99	3.28	4.73	2.73
-		R(r)	2.06	2.79	4.08	4.80	3.43
P		R(c)	1.31	2.32	3.37	4.64	2.91
P		R(r)	1.78	3.03	3.64	4.99	3.36
K Na Mg		R(c)	1.26	2.60	3.95	5.24	3.26
K Na Mg		R(r)	1.61	2.53	3.54	5.91	3.40
P K Na Mg		R(c)	1.23	2.32	4.32	5.56	3.36
P K Na Mg		R(r)	2.20	3.89	4.94	6.29	4.33

** For explanation of symbols see 'Details' 1967

NOTE: (c) = continuous (i.e. barley after barley)
(r) = rotational (i.e. barley after beans)

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72/R/HB/2

BARLEY

Plots	Treatment**			GRAIN: TONNES/ HECTARE	STRAW: TONNES/ HECTARE
	1852-1972		1852-1966		
551	N2	PK	N	5.63	4.33
561	-	PK	-	1.65	0.77
571	N2	-	N*	4.91	2.88
581	N2	-	N*	4.25	2.51

** For explanation of symbols see 'Details' 1967

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72/R/HE/2

POTATOES

N: KG/HA 1971

Treatment**		0	48	96	144	Mean
TOTAL TUBERS: TONNES/HECTARE						
1852-1972 1852-1966						
-	R	18.9	17.4	19.8	20.4	19.1
P	R	8.0	7.0	10.3	8.0	8.3
K Na Mg	R	29.7	27.9	31.0	31.3	30.0
P K Na Mg	R	37.0	37.7	37.6	35.4	36.9
Mean		23.4	22.5	24.7	23.8	23.6
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE						
-	R	85.0	88.8	87.6	86.9	87.1
P	R	33.6	40.3	50.8	36.6	40.3
K Na Mg	R	91.4	90.2	91.6	95.7	92.2
P K Na Mg	R	87.3	87.0	90.3	84.4	87.3
Mean		74.3	76.6	80.1	75.9	76.7

** For explanation of symbols see 'Details' 1967

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72/R/HB/2

BEANS

N: KG/HA 1970

Treatment**			0	48	96	144	Mean
1852-1972	1852-1966		GRAIN: TONNES/HECTARE				
-		N*	2.55	2.32	2.68	2.16	2.43
Si		N*	1.80	2.10	2.10	2.24	2.06
P		N*	2.63	1.84	2.30	2.08	2.22
P Si		N*	1.36	1.44	1.16	1.81	1.44
K Na Mg		N*	3.50	3.11	3.01	3.21	3.21
K Na Mg Si		N*	3.63	3.00	3.83	2.87	3.33
P K Na Mg		N*	3.50	3.40	4.03	2.33	3.31
P K Na Mg Si		N*	3.59	4.00	3.02	3.49	3.53
-		R	3.06	2.95	3.53	3.04	3.15
P		R	2.62	3.50	2.24	3.08	2.86
K Na Mg		R	3.11	2.78	3.24	3.16	3.07
P K Na Mg		R	3.96	3.70	3.99	4.27	3.98
			STRAW: TONNES/HECTARE				
-		N*	0.98	1.30	0.89	1.49	1.17
Si		N*	1.40	1.65	1.20	1.21	1.37
P		N*	2.05	1.91	1.38	2.01	1.84
P Si		N*	1.44	1.49	0.92	1.90	1.44
K Na Mg		N*	2.05	1.40	1.22	2.22	1.72
K Na Mg Si		N*	1.94	1.69	2.49	1.54	1.92
P K Na Mg		N*	2.39	3.07	4.62	2.33	3.10
P K Na Mg Si		N*	3.18	3.86	2.90	3.12	3.27
-		R	1.84	1.66	2.02	2.15	1.92
P		R	1.82	1.97	1.91	2.18	1.97
K Na Mg		R	2.48	2.35	2.48	2.45	2.44
P K Na Mg		R	3.90	3.70	4.37	3.90	3.97

** For explanation of symbols see 'Details' 1967

Mean D.M. % (all plots): Grain: 80.8
Straw: 48.9

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72/R/WF/3

WHEAT AND FALLOW

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

The 117th year, winter wheat.

For previous years see 'Details' 1967, 68/A/3(t) and 69-71/R/WF/3.

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

Seed: Cappelle (dressed with dieldrin) sown at 200 kg.

Cultivations, etc.: Ploughed: 4 Oct, 1971. Seed drilled: 22 Oct. Sprayed with MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l): 27 Apr, 1972. Combine harvested: 1 Sept.

Fallow plots: Ploughed 3 times: 4 Oct, 1971, 11 May, 1972, 11 July.

TABLES OF MEANS

Plot No.	3	5	7
No. of years of fallow	1	1	3
	GRAIN: TONNES/HECTARE		
	1.88	1.80	2.21
	STRAW: TONNES/HECTARE		
	0.82	0.72	0.75

Mean D.M. %: Grain: 82.2
Straw: 76.7

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72/R/EX/4

EXHAUSTION LAND

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

The 117th year, barley.

For previous years see 'Details' 1967, 68/A/7 and 69-71/R/EX/4.

Area harvested: 0.03000.

Seed: Julia, dressed with ethirimol, sown at 1.6 kg.

Cultivations, etc.: Sprayed with aminotriazole at 4.5 kg and ammonium thiocyanate at 4.1 kg in 220 l: 10 Sept, 1971. Ploughed: 8 Nov. Seed combine drilled: 16 Mar, 1972. Sprayed with MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l): 18 May. Combine harvested: 23 Aug.

TABLE OF MEANS

Plot	1876 - 1901	GRAIN: TONNES/HECTARE	STRAW: TONNES/HECTARE
1	-	2.54	1.55
2	-	3.17	1.76
3	D	5.80	3.57
4	D	5.06	3.57
5	N	3.04	1.58
6	N*	2.76	1.83
7	N PKNa Mg	5.39	3.49
8	N* PKNa Mg	4.71	3.19
9	P	4.92	3.03
10	PKNa Mg	5.35	3.49
Mean		4.27	2.71
Mean D.M. %:		84.3	90.6

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72/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 117th year, hay.

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

Treatments: Plot 6 (South) which was excluded from the Classical experiment in the period 1965 - 71 and used for microplot experiments in the period 1967 - 70 is now included in the Classical experiment again - PK Na Mg manuring as in the past: N, as sulphate of ammonia, at 48 kg.

Ground chalk was applied as follows (kg Ca CO3):-
Plot 1a, 2a, 3a, 4/1a, 7a, 8a, 9a, 13a, 14a, 16a, 17a - 2000
Plot 18a, 18/2 - 1140.

Cultivations, etc.: Ground chalk applied: 29 Nov, 1971. Mineral fertilisers applied: 30 Nov. N applied: 1st dressing - 13 Apr, 1972, 2nd dressing - 3 May. Cut twice: 15 June, 14 Sept.

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TABLE OF MEANS

DRY MATTER: TONNES/HECTARE

Plot	1st cut a	b	c	d	Mean	2nd cut a	b	c	d	Mean	Total of 2 cuts a	b	c	d	Mean
1	2.24	2.03	2.23	0.65	1.79	1.17	1.21	0.71	0.66	0.94	3.40	3.24	2.94	1.30	2.72
2	1.61	1.43	1.47	1.34	1.46	0.74	0.93	1.07	1.10	0.96	2.36	2.36	2.54	2.44	2.42
3	1.46	1.30	1.22	1.40	1.34	0.65	0.88	0.81	0.98	0.83	2.11	2.17	2.03	2.38	2.17
4-1	2.36	2.24	2.26	1.97	2.21	0.99	1.03	1.12	1.18	1.08	3.35	3.27	3.38	3.16	3.29
4-2	3.39	3.22	3.50	3.15	3.32	1.15	1.13	0.88	1.17	1.08	4.54	4.35	4.38	4.32	4.40
6	5.86	5.40			5.63	1.88	1.77			1.82	7.73	7.17			7.45
7	5.68	5.39	2.79	2.72	4.14	3.13	3.05	1.63	1.40	2.30	8.81	8.44	4.42	4.12	6.45
8	1.97	1.78	2.36	2.27	2.10	1.30	1.12	1.62	1.53	1.39	3.27	2.90	3.99	3.81	3.49
9	6.62	5.90	6.68	6.25	6.36	2.01	2.18	1.25	1.34	1.69	8.63	8.08	7.92	7.59	8.05
10	3.47	3.66	4.13	3.05	3.58	1.18	1.17	1.17	1.54	1.27	4.65	4.83	5.30	4.59	4.84
11-1	7.26	7.47	8.56	7.69	7.75	2.91	2.67	2.59	2.25	2.61	10.17	10.14	11.15	9.94	10.35
11-2	8.27	8.05	8.53	7.96	8.20	3.24	3.26	2.54	2.69	2.93	11.51	11.31	11.07	10.65	11.14
12	1.93		1.54		1.74	1.59		1.36		1.48	3.52		2.91		3.22
13	3.84	4.51	4.20	3.16	3.93	2.78	2.86	2.05	1.74	2.36	6.62	7.37	6.26	4.90	6.29
14	4.85	5.60	6.46	6.75	5.92	0.97	2.16	3.32	3.16	2.40	5.82	7.76	9.78	9.91	8.32
15	4.32		2.70		3.51	2.64		1.68		2.16	6.96		4.38		5.67
16	5.20	5.24	5.32	5.12	5.22	2.24	2.50	2.29	2.05	2.27	7.44	7.74	7.61	7.17	7.49
17	2.16	2.49	2.52	2.27	2.36	1.47	1.20	1.66	1.79	1.53	3.63	3.69	4.18	4.06	3.89
18	2.23	2.21	3.17	1.12	2.18	1.18	1.32	0.93	0.80	1.06	3.41	3.53	4.10	1.92	3.24
18-2					2.17					1.32					3.49
19-1					3.57					1.56					5.13
19-2					4.17					1.90					6.07
19-3					4.36					1.96					6.33
20-1					5.34					1.89					7.23
20-2					4.42					1.91					6.33
20-3					4.92					1.95					6.88

Mean D.M. %: 1st cut: 23.5 2nd cut: 30.9 Total of 2 cuts: 27.2

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72/R/AG/6

AGDELL

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

The third year of revised scheme. Crops, potatoes, sugar beet, oats.

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

Sub-plot dimensions:
Oats: Plots 1, 2, 3, 4 - 12.1 x 6.04. Plots 5, 6 - 10.9 x 6.04.
Potatoes, sugar beet: Plots 1, 2, 3, 4 - 6.04 x 3.02. Plots 5, 6 - 5.43 x 3.02.

Area harvested: Sugar beet: 0.00077, potatoes: 0.00069, oats: 0.00244.

Rotation (P test) plots continued in potatoes and sugar beet. Plots fallowed in 1971 (K test) were sown to spring oats.

Standard applications:
Potatoes: Manures: 250 kg N, 250 kg K_2O, 100 kg MgO as 'Nitro-Chalk', muriate of potash and kieserite. Weedkillers: Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 450 l. Insecticide: Menazon at 0.22 kg in 340 l. Fungicide: Mancozeb at 1.3 kg in 340 l.
Sugar beet: Manures: 190 kg N, 310 kg K_2O, 100 kg MgO as 'Nitro-Chalk', muriate of potash and kieserite. Insecticides: Pyrethrum ('Py' at 2.1 l in 340 l). Menazon at 0.22 kg in 340 l.
Oats: Manures: 75 kg N, 33 kg P_2O_5 as (30:13:0). Weedkillers: Bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seeds: Potatoes: King Edward.
Sugar beet: Klein E, sown at 5.6 kg.
Oats: Manod, sown at 210 kg.

ltivations, etc.:- All plots ploughed: 8 Oct, 1971.
Potatoes: Test P, basal N, K and Mg applied: 28 Mar, 1972. Rotary cultivated: 24 Apr. Planted: 25 Apr. Weedkiller applied:

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22 May. Insecticide applied: 22 June, 13 July. Fungicide applied: 13 July, 1 Aug. Lifted: 10 - 12 Oct.

Sugar beet: Test P, basal N, K and Mg applied: 29 Mar, 1972. Power harrowed: 17 Apr. Drilled: 18 Apr. Singled: 5 - 6 June. Pyrethrum applied: 11 May. Menazon applied: 22 June, 13 July. 1 Aug. Lifted: 16 - 20 Oct.

Oats: Basal NP applied, seed drilled: 23 Mar, 1972. Weedkiller applied: 18 May. Combine harvested: 31 Aug.

NOTE: Green crop samples of oats were taken in July for determination of total dry matter.

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72/R/AG/6

TABLES OF MEANS

SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

1848 - 1951

		None		PK		NPK		
		Plot						
		5	6	3	4	1	2	Mean
P		Previous cropping 1958-69, Arable or fallow						
1964	1970-72							
0	0	36.5	28.4	44.0	31.3	34.7	45.6	36.8
1	0	37.3	32.5	42.3	37.3	38.8	38.1	37.7
2	0	35.4	40.5	38.6	41.7	39.6	42.7	39.7
4	0	37.9	33.7	43.6	40.6	37.5	39.0	38.7
0	1	36.4	40.8	44.8	36.8	34.9	44.5	39.7
1	1	37.7	38.6	42.7	40.9	29.4	41.2	38.4
2	1	34.9	42.9	39.7	39.6	36.0	41.0	39.0
4	1	42.0	38.8	38.3	42.5	38.8	39.9	40.0
Mean		37.3	37.0	41.8	38.8	36.2	41.5	38.8
P		Previous cropping 1958-69, Grass						
1964-69	1970-72							
0	0	17.0	8.0	25.4	14.0	34.9	24.1	20.6
1	0	33.6	37.1	41.7	35.5	41.8	41.9	38.6
2	0	39.9	39.6	40.1	39.3	37.4	40.1	39.4
4	0	36.7	40.1	42.6	37.3	34.6	40.4	38.6
0	1	35.5	38.3	42.3	37.4	37.4	36.5	37.9
1	1	36.7	40.4	42.3	32.6	41.4	41.7	39.2
2	1	34.9	43.8	39.9	33.7	37.8	41.2	38.5
4	1	40.5	38.9	39.9	32.1	41.4	38.1	38.5
Mean		34.4	35.8	39.3	32.7	38.3	38.0	36.4

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SUGAR BEET

SUGAR PERCENTAGE

1848 - 1951

		None		PK		NPK		
		Plot						
		5	6	3	4	1	2	Mean
P		Previous cropping 1958-69, Arable or fallow						
1964	1970-72							
0	0	18.2	16.8	18.1	17.8	17.5	17.3	17.6
1	0	18.5	18.3	18.8	18.8	18.5	18.3	18.5
2	0	17.7	18.1	18.7	18.3	18.6	18.1	18.3
4	0	17.8	17.6	18.1	18.3	18.4	18.2	18.1
0	1	18.7	18.0	18.7	19.0	17.7	18.2	18.4
1	1	18.2	18.5	18.5	19.0	17.5	18.4	18.4
2	1	18.3	18.1	17.7	17.4	18.2	17.7	17.9
4	1	18.4	18.1	18.3	18.5	18.1	18.0	18.2
Mean		18.2	17.9	18.4	18.4	18.1	18.0	18.2
P		Previous cropping 1958-69, Grass						
1964-69	1970-72							
0	0	17.6	17.8	17.2	18.1	17.6	16.4	17.4
1	0	18.1	17.8	18.0	17.6	17.5	17.2	17.7
2	0	17.8	17.7	18.0	17.6	17.5	16.8	17.6
4	0	18.0	17.7	18.2	17.0	17.6	17.6	17.7
0	1	18.0	17.7	18.0	18.1	18.0	17.8	17.9
1	1	18.0	17.8	17.4	18.3	18.3	17.6	17.9
2	1	18.0	17.8	18.1	17.8	18.7	17.8	18.1
4	1	17.9	17.3	17.8	17.5	17.9	18.1	17.8
Mean		17.9	17.7	17.8	17.7	17.9	17.4	17.8

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72/R/AG/6

SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

1848 - 1951

		None		PK		NPK		
		Plot						
		5	6	3	4	1	2	Mean
P		Previous cropping 1958-69, Arable or fallow						
1964	1970-72							
0	0	6.64	4.77	7.95	5.57	6.08	7.89	6.48
1	0	6.90	5.95	7.95	7.00	7.18	6.98	6.99
2	0	6.24	7.36	7.22	7.61	7.37	7.74	7.26
4	0	6.73	5.95	7.91	7.45	6.89	7.10	7.01
0	1	6.82	7.36	8.35	6.98	6.20	8.09	7.30
1	1	6.86	7.14	7.91	7.76	5.15	7.57	7.07
2	1	6.40	7.76	7.05	6.91	6.55	7.28	6.99
4	1	7.74	7.02	7.02	7.86	7.01	7.17	7.30
Mean		6.79	6.66	7.67	7.14	6.55	7.48	7.05
P		Previous cropping 1958-69, Grass						
1964-69	1970-72							
0	0	2.99	1.42	4.37	2.53	6.16	3.94	3.57
1	0	6.07	6.60	7.52	6.25	7.31	7.23	6.83
2	0	7.10	7.03	7.23	6.93	6.56	6.76	6.93
4	0	6.62	7.12	7.73	6.32	6.10	7.10	6.83
0	1	6.38	6.77	7.64	6.76	6.72	6.49	6.79
1	1	6.60	7.19	7.35	5.96	7.57	7.33	7.00
2	1	6.29	7.78	7.22	6.01	7.08	7.33	6.95
4	1	7.26	6.73	7.10	5.62	7.42	6.89	6.84
Mean		6.16	6.33	7.02	5.80	6.87	6.63	6.47

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72/R/AG/6

SUGAR BEET

TOPS: TONNES/HECTARE

1848 - 1951

		None		PK		NPK		
		Plot 5	6	3	4	2	1	Mean
P		Previous cropping 1958-69, Arable or fallow						
1964	1970-72							
0	0	40.3	40.3	44.0	38.2	45.8	56.4	44.1
1	0	38.2	34.2	40.5	36.4	37.6	48.7	39.3
2	0	38.2	49.7	39.9	47.0	45.8	44.0	44.1
4	0	53.0	46.3	52.8	45.8	41.1	47.6	47.8
0	1	40.9	45.6	42.3	35.8	45.8	51.1	43.6
1	1	41.6	39.6	47.6	43.4	42.9	44.0	43.2
2	1	44.3	47.0	47.6	50.5	44.6	55.8	48.3
4	1	45.0	42.3	44.6	43.4	47.0	48.1	45.1
Mean		42.7	43.1	44.9	42.6	43.8	49.5	44.4
P		Previous cropping 1958-69, Grass						
1964-69	1970-72							
0	0	18.8	11.4	32.3	18.2	45.2	38.2	27.3
1	0	42.9	48.3	47.0	45.8	49.9	52.3	47.7
2	0	42.9	53.0	55.8	39.3	47.0	59.9	49.7
4	0	47.0	48.3	48.7	47.6	51.1	51.1	49.0
0	1	51.0	57.0	54.0	44.6	51.1	51.7	51.6
1	1	39.6	55.0	52.8	39.9	54.6	59.9	50.3
2	1	49.7	53.0	51.7	35.8	47.0	53.4	48.4
4	1	47.0	51.0	45.8	36.4	49.3	47.6	46.2
Mean		42.4	47.1	48.5	38.5	49.4	51.7	46.3

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72/R/AG/6

SUGAR BEET

PLANT NUMBER: THOUSANDS/HECTARE

1848 - 1951

		None		PK		NPK		
				Plot				
		5	6	3	4	1	2	Mean
P		Previous cropping 1958-69, Arable or fallow						
1964	1970-72							
0	0	99.1	121.3	94.5	90.6	86.7	93.2	97.6
1	0	108.0	105.0	90.6	94.5	94.5	89.3	97.0
2	0	88.8	113.9	98.4	101.0	88.0	99.7	98.3
4	0	87.3	93.2	98.4	98.4	94.5	91.9	93.9
0	1	93.2	103.5	99.7	90.6	91.9	94.5	95.6
1	1	100.6	97.6	101.0	93.2	97.1	93.2	97.1
2	1	103.5	116.9	94.5	101.0	89.3	90.6	99.3
4	1	87.3	94.7	94.5	97.1	95.8	90.6	93.3
Mean		96.0	105.8	96.4	95.8	92.2	92.9	96.5
P		Previous cropping 1958-69, Grass						
1964-69	1970-72							
0	0	96.2	96.2	90.6	80.3	90.6	98.4	92.0
1	0	110.9	94.7	95.8	124.3	94.5	91.9	102.0
2	0	105.0	90.2	93.2	88.0	95.8	95.8	94.7
4	0	99.1	97.6	101.0	88.0	90.6	90.6	94.5
0	1	91.7	91.7	98.4	99.7	91.9	93.2	94.4
1	1	94.7	100.6	98.4	101.0	108.7	95.8	99.9
2	1	100.6	88.8	85.4	84.1	88.0	99.7	91.1
4	1	100.6	91.7	101.0	99.7	98.4	91.9	97.2
Mean		99.9	93.9	95.5	95.6	94.8	94.7	95.7

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72/R/AG/6

POTATOES

TOTAL TUBERS: TONNES/HECTARE

1848 - 1951

	None		PK		NPK		
	Plot 5	6	3	4	1	2	Mean
P	Previous cropping 1958-69, Arable or fallow						
1964 1970-72							
0 0	32.8	36.2	49.2	40.0	45.2	42.3	41.0
1 0	40.8	31.7	47.6	42.3	47.2	49.9	43.2
2 0	44.2	42.6	46.6	39.3	46.9	51.2	45.1
4 0	42.6	42.3	55.8	49.2	53.2	53.5	49.4
0 1	46.4	46.0	50.2	43.3	49.2	54.2	48.2
1 1	46.4	46.0	51.2	50.5	52.2	55.5	50.3
2 1	54.7	44.9	57.8	43.6	52.2	54.8	51.3
4 1	46.8	49.1	62.7	49.2	54.8	55.2	53.0
Mean	44.3	42.4	52.6	44.7	50.1	52.1	47.7
P	Previous cropping 1958-69, Grass						
1964-69 1970-72							
0 0	25.3	21.5	30.7	26.8	52.5	38.6	32.6
1 0	47.6	47.2	53.8	44.9	53.5	50.5	49.6
2 0	49.4	42.6	53.2	50.9	54.5	55.5	51.0
4 0	52.5	51.0	56.5	53.8	49.5	55.5	53.1
0 1	46.0	50.6	55.8	46.9	59.4	54.2	52.2
1 1	52.1	52.1	59.4	51.8	53.8	57.5	54.5
2 1	51.0	51.7	49.2	54.2	66.1	60.4	55.4
4 1	45.3	52.1	53.2	42.6	58.5	58.5	51.7
Mean	46.1	46.1	51.5	46.5	56.0	53.8	50.0

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72/R/AG/6

POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

1848 - 1951

	None		PK		NPK		
	Plot 5	6	3	4	1	2	Mean
P	Previous cropping 1958-69, Arable or fallow						
1964 1970-72							
0 0	85.7	87.5	88.7	90.9	87.1	82.9	87.2
1 0	87.4	91.7	85.3	89.1	82.1	81.6	86.2
2 0	88.3	88.5	86.7	85.7	83.9	87.2	86.7
4 0	88.0	85.7	79.9	86.6	80.6	82.1	83.8
0 1	85.1	86.1	84.2	87.0	81.9	82.8	84.5
1 1	83.9	91.0	85.6	86.9	81.0	80.0	84.7
2 1	84.9	86.6	79.0	83.3	82.1	85.4	83.5
4 1	83.9	88.5	84.0	84.6	81.1	78.7	83.5
Mean	85.9	88.2	84.2	86.8	82.5	82.6	85.0
P	Previous cropping 1958-69, Grass						
1964-69 1970-72							
0 0	81.2	82.5	85.4	84.6	92.1	85.7	85.3
1 0	90.2	84.0	89.2	93.8	87.1	87.7	88.7
2 0	88.9	87.6	89.5	85.2	88.0	85.7	87.5
4 0	89.3	90.4	88.4	87.3	80.3	84.6	86.7
0 1	88.0	89.6	88.2	91.2	87.8	83.5	88.0
1 1	88.0	87.0	85.5	91.3	80.3	80.1	85.4
2 1	85.9	85.4	90.4	84.2	87.0	80.7	85.6
4 1	88.8	88.4	81.9	88.0	84.0	82.5	85.6
Mean	87.5	86.8	87.3	88.2	85.8	83.8	86.6

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72/R/AG/6

OATS

GRAIN: TONNES/HECTARE

	Plot 5	6	3	4	1	2	Mean
K	Previous cropping 1959-62, Arable. 1963-71, Fallow						
0	4.69	4.85	4.56	4.75	4.70	6.01	4.93
1	7.58	4.55	4.72	5.06	4.76	3.98	5.11
2	4.27	1.83	4.96	4.76	4.91	4.86	4.27
4	4.16	7.94	4.53	5.16	4.49	4.57	4.41
Mean	5.18	4.80	4.69	4.93	4.71	3.75	4.68
K	Previous cropping 1958-70, Grass 1971, Fallow						
0	3.74	4.33	5.12	4.56	4.39	3.81	4.33
1	4.57	4.29	4.28	5.15	5.59	6.55	5.07
2	4.56	3.94	4.84	4.88	4.24	3.52	4.16
4	4.29	3.66	4.05	3.26	3.73	2.95	3.65
Mean	4.29	4.05	4.57	4.21	4.49	4.21	4.30

Mean D.M. %: 86.5

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72/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 fifth year of the new scheme, beans, spring wheat, barley.

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

Plot dimensions and areas harvested:
Wheat and barley (quarter plot): 5.33 x 28.5.
(Strip 1: 3.56 x 28.5). Area harvested: 0.00780.
Beans, Section 1 (half plot): 10.7 x 27.4.
(Strips 1 and 8: 70.1 x 27.4). Area harvested: 0.00878.

Continuous spring beans: Fresh simazine was applied only to those half plots on Sections 1 and 2 which received simazine in 1967 but not subsequently.

Standard applications:
Spring beans: Weedkiller: Paraquat at 0.56 kg ion in 220 l.
Insecticide: Phorate at 1.1 kg applied as granules.
Spring wheat and barley: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Seed: Beans: Maris Bead sown at 220 kg.
Spring wheat: Kolibri sown at 190 kg,
Barley: Julia dressed with ethirimol, sown at 160 kg.

Cultivations, etc.: P, K, Na and Mg applied: Strip 2 only - 15 Nov, 1971, remainder 30 Nov. FYM applied: 16 Nov.
FYM ploughed in: 17 Nov. Remaining plots ploughed: 9 - 15 Dec.
Spring beans: Paraquat applied: 10 Sept, 1971. Seed drilled: 22 Mar, 1972. Simazine applied to appropriate half plots at 1.1 kg in 220 l: 2 May. Insecticide applied: 17 June. Combine harvested: 27 Sept.
Spring wheat: N applied: 21 Mar, 1972. Seed drilled: 22 Mar. Weedkiller applied: 17 May. Combine harvested: 6 Sept.
Barley: N applied: 21 Mar, 1972. Seed drilled: 22 Mar. Weedkiller applied: 17 May. Combine harvested: 22 Aug.

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72/R/BN/7

TABLES OF MEANS

BARLEY

GRAIN: TONNES/HECTARE

Strip	N	SERIES N	A	AC	C
1	0	5.65	-	-	4.94
	1	-	7.02	7.24	-
	2	6.17	-	-	6.37
	3	-	6.97	6.55	-
2	0	-	3.77	3.83	-
	1	6.90	-	-	6.32
	2	-	6.92	6.47	-
	3	5.63	-	-	6.80
4	0	2.18	-	-	1.84
	1	-	4.31	4.77	-
	2	6.53	-	-	6.29
	3	-	6.80	6.93	-
5	0	1.97	-	-	2.25
	1	-	5.63	5.57	-
	2	5.38	-	-	6.87
	3	-	6.13	7.16	-
6	0	-	1.71	1.93	-
	1	4.28	-	-	5.10
	2	-	5.87	7.09	-
	3	6.55	-	-	6.07
7	0	-	1.76	2.28	-
	1	5.25	-	-	5.48
	2	-	6.33	6.77	-
	3	5.59	-	-	6.96
8	0	-	1.67	2.82	-
	1	3.82	-	-	5.13
	2	-	6.23	7.07	-
	3	6.21	-	-	6.90
9	0			1.44	
	1			4.50	
	2			5.04	
	3			6.78	

Mean D.M. %: 84.8

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72/R/BN/7

BARLEY

STRAW: TONNES/HECTARE

Strip	N	SERIES N	A	AC	C
1	0	3.54	-	-	3.42
	1	-	6.38	5.79	-
	2	6.76	-	-	5.86
	3	-	6.73	6.56	-
2	0	-	2.03	2.66	-
	1	6.44	-	-	4.59
	2	-	7.09	5.74	-
	3	7.77	-	-	7.62
4	0	1.21	-	-	0.86
	1	-	3.11	2.94	-
	2	5.44	-	-	5.79
	3	-	5.62	5.77	-
5	0	1.07	-	-	0.89
	1	-	3.83	4.11	-
	2	5.06	-	-	5.14
	3	-	5.25	5.36	-
6	0	-	0.87	1.06	-
	1	3.19	-	-	4.23
	2	-	4.79	5.38	-
	3	5.16	-	-	5.90
7	0	-	0.65	0.87	-
	1	3.25	-	-	3.85
	2	-	5.04	5.72	-
	3	5.19	-	-	6.82
8	0	-	0.60	1.19	-
	1	2.62	-	-	3.03
	2	-	4.32	4.74	-
	3	4.68	-	-	5.45
9	0		0.81		
	1		3.11		
	2		4.47		
	3		5.57		

Mean D.M. %: 87.9

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72/R/BN/7

SPRING WHEAT

GRAIN: TONNES/HECTARE

Strip	N	SERIES N	A	AC	C
1	0	-	3.22	2.68	-
	1	3.99	-	-	5.29
	2	-	6.51	5.54	-
	3	6.30	-	-	4.90
2	0	2.88	-	-	1.94
	1	-	5.91	5.04	-
	2	5.89	-	-	5.37
	3	-	6.21	5.99	-
4	0	-	0.91	0.68	-
	1	3.69	-	-	2.84
	2	-	2.96	3.20	-
	3	5.34	-	-	4.93
5	0	-	0.90	1.12	-
	1	2.89	-	-	3.23
	2	-	4.43	4.42	-
	3	4.65	-	-	5.17
6	0	1.29	-	-	0.97
	1	-	2.27	2.67	-
	2	3.74	-	-	4.21
	3	-	4.17	4.82	-
7	0	1.06	-	-	1.52
	1	-	3.08	3.59	-
	2	3.50	-	-	4.70
	3	-	5.22	5.48	-
8	0	0.92	-	-	1.41
	1	-	3.00	3.93	-
	2	3.69	-	-	4.49
	3	-	5.01	4.37	-

Mean D.M. %: 83.3

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72/R/BN/7

SPRING WHEAT

STRAW: TONNES/HECTARE

Strip	N	SEROES			
		N	A	AC	C
1	0	-	4.03	3.19	-
	1	5.01	-	-	7.03
	2	-	8.53	7.18	-
	3	9.81	-	-	7.17
2	0	3.69	-	-	1.87
	1	-	7.13	5.87	-
	2	6.71	-	-	8.28
	3	-	7.64	7.71	-
4	0	-	1.23	0.79	-
	1	4.48	-	-	3.34
	2	-	3.37	3.34	-
	3	6.99	-	-	6.20
5	0	-	1.40	1.56	-
	1	3.02	-	-	3.92
	2	-	5.22	4.79	-
	3	5.38	-	-	6.17
6	0	1.19	-	-	1.40
	1	-	2.91	3.77	-
	2	5.09	-	-	4.28
	3	-	5.50	5.67	-
7	0	1.35	-	-	1.73
	1	-	3.52	4.15	-
	2	3.68	-	-	4.95
	3	-	5.62	5.91	-
8	0	0.81	-	-	1.33
	1	-	2.95	3.56	-
	2	4.11	-	-	4.68
	3	-	4.97	4.29	-

Mean D.M. %: 83.2

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72/R/BN/7

BEANS

SIMAZINE

Strip	1967-70	1967-69 & 1971	1967 & 1972	Mean
	GRAIN: TONNES/HECTARE			
1	3.72	2.54	2.72	2.92
2	3.60	3.31	3.54	3.50
4	3.58	3.65	3.01	3.32
5	3.54	2.95	3.28	3.26
6	3.69	3.38	3.07	3.30
7	3.69	3.20	3.42	3.43
8	3.09	2.71	3.05	2.97
Mean	3.56	3.11	3.16	3.24
	STRAW: TONNES/HECTARE			
1	4.20	2.22	2.41	2.81
2	2.74	2.32	2.80	2.66
4	3.00	2.53	1.76	2.27
5	2.49	2.44	1.77	2.12
6	2.82	2.82	1.66	2.24
7	2.41	2.76	2.23	2.41
8	1.76	1.36	1.48	1.52
Mean	2.77	2.35	2.02	2.29

Mean D.M. %: Grain: 82.4
Straw: 51.4

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72/R/GC/8

GARDEN CLOVER

Object: To study the effects of nitrogen and magnesium on continuous red clover - Manor Garden.

The 119th year, red clover.

For previous years see 'Details' 1967, 68/A/8(t) and 69-71/R/GC/8.

Whole plot dimensions: 2.13 x 3.05. Area harvested: 0.00007.

Seed: English Leafy Broad Red, sown at 34 kg.

Cultivations, etc.: Area hand dug, all plants removed: 7 Oct, 1971. Basal PK and test Mg applied: 13 Mar, 1972. Area raked down to seedbed, seed sown, test N applied: 24 Mar. Cut, basal K, test N and Mg applied: 3 Aug. Cut, basal K, test N applied: 21 Sept. Cut: 13 Oct.

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

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

	N0Mg0	N0Mg1	N1Mg0	N1Mg1	Mean
1st cut	1.33	1.57	2.27	2.91	2.02
2nd cut	1.35	1.60	1.77	1.95	1.67
3rd cut	0.46	0.41	0.58	0.60	0.51
Total of 3 cuts	3.14	3.58	4.62	5.47	4.20

Mean D.M. %: 1st cut: 21.8
2nd cut: 17.9
3rd cut: 18.8
Total of 3 cuts: 19.5

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72/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/S/RN/1.

Whole plot dimensions (new plots): 5.49 x 17.1.

Area harvested: Grass: 1st cut: New treatments: 0.00003
Old treatments: 0.00050
2nd cut: New treatments: 0.00139
Old treatments: 0.00050
Lucerne: New treatments: 0.00106
Old treatments: 0.00139

Seed:- Grass: Timothy S352 and Meadow Fescue S215
Lucerne: Europe.

Cultivations, etc.:

Grass: P and K applied: 15 Feb, 1972. Bonemeal applied: 22 Feb. N applied: 27 Mar. Cut: Blocks 3 and 4 - 23 May, 16 Aug, blocks 1 and 2 - 1 June, 16 Aug. N applied after the first cut.

Lucerne: P and K applied: 15 Feb, 1972. Bonemeal applied: 22 Feb. Cut: 7 June, 10 Aug.

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TABLES OF MEANS

OLD TREATMENTS

GRASS, DRY MATTER: TONNES/HECTARE

Treatment 1899-1972	1st cut	2nd cut	Total of 2 cuts
D*	2.38	0.53	2.92
B	0.61	0.00	0.61
N	2.68	1.19	3.86
P	0.69	0.00	0.69
K	0.51	0.00	0.51
-	0.58	0.00	0.58
PK	0.72	0.00	0.72
NK	2.41	1.44	3.85
NP	2.52	1.49	4.01
NPK	2.93	1.93	4.87
Mean	1.60	0.66	2.26

Mean D.M. %: 1st cut: 27.7
2nd cut: 24.1
Total of 2 cuts: 25.9

* Last applied autumn 1969

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72/S/RN/1

NEW TREATMENTS

GRASS, DRY MATTER: TONNES/HECTARE

Treatment 1899-1965	Treatment* from 1966	1st cut	2nd cut	Total of 2 cuts
D	DN1	6.81	3.88	10.69
B	B	5.41	3.71	9.12
N	N2P2	5.90	3.58	9.48
P	N1P1	5.60	3.79	9.39
K	N1P2K	5.82	3.99	9.81
-	N1P2	5.52	3.65	9.17
PK	N1P1K	5.89	4.08	9.97
NK	N2P2K	5.95	4.09	10.04
NP	N2P1	5.63	3.51	9.14
NPK	N2P1K	6.10	3.88	9.98
Mean		5.86	3.82	9.68

Mean D.M. %: 1st cut: 22.2
2nd cut: 43.1
Total of 2 cuts: 32.6

* N not tested since 1970 - all treatments receive basal N at 100 kg for each cut. FYM last applied autumn 1969.

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72/S/RN/1

NEW TREATMENTS

LUCERNE, DRY MATTER: TONNES/HECTARE

Treatment 1899-1965	Treatment* from 1966	1st cut	2nd cut	Total of 2 cuts
D	DN1	5.37	5.33	10.70
B	B	3.96	4.54	8.50
N	N2P2	4.29	4.63	8.92
P	N1P1	3.87	4.63	8.50
K	N1P2K	4.73	5.33	10.06
-	N1P2	4.08	4.70	8.78
PK	N1P1K	4.61	5.17	9.77
NK	N2P2K	4.64	5.08	9.72
NP	N2P1	3.82	4.40	8.22
NPK	N2P1K	4.36	5.07	9.43
Mean		4.37	4.89	9.26

Mean D.M. %: 1st cut: 32.2
2nd cut: 27.0
Total of 2 cuts: 29.6

* N not applied since 1970. FYM last applied autumn 1969.

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72/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 fourth 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 - 71/S/RN/2.

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

Basal applications:
Potatoes: Manures as previously. Weedkiller: Linuron at 0.84 kg plus paraquat at 0.84 kg ion in 450 l. Fungicide: Mancozeb at 2.7 kg in 450 l on 4 occasions. Insecticide: Menazon ('Saphi-Col' at 0.7 l in 450 l) on 3 occasions.
Barley: Manures: 100 kg N and 64 kg K20 as (25:0:16). Weedkiller: Dichlorprop plus MCPA·('Mephetol Plus') at 5.6 l in 450 l. Fungicide: Tridemorph 0.52 kg in 450 l.
Sugar beet: Manures as previously. Insecticide: DDT at 1.0 kg in 560 l. Menazon ('Saphi-Col' at 0.7 l in 450 l) on 4 occasions.

Seed: Potatoes: King Edward.
Barley: Julia sown at 170 kg (15 cm spacing between rows).
Sugar beet: Klein E rubbed and graded, sown at 6.7 kg.

Cultivations, etc.:
Potatoes: Ploughed: 29 Oct, 1971. Test P and basal NK applied, plots rotary cultivated, potatoes planted: 20 Apr, 1972. Weedkiller applied: 23 May. Insecticide and fungicide applied: 28 June, 11 July, 27 July. Fungicide applied: 16 Aug. Lifted: 21 Sept.
Barley: Ploughed: 29 Oct, 1971. Seed drilled, basal NK applied: 27 Mar, 1972. Weedkiller and fungicide applied: 16 May. Harvested by hand: 15 Aug.

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72/S/RN/2

Sugar beet: Ploughed: 29 Oct, 1971. Test P and basal NK applied, seed drilled: 6 Apr, 1972. Insecticides applied: DDT: 1 May, menazon: 9 May, 28 June, 11 July, 27 July. Singled: 15 May. Lifted: 26 Sept.

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72/S/RN/2

TABLES OF MEANS

POTATOES

TOTAL TUBERS: TONNES/HECTARE

Plot	Treatment 1966 and 1967	1972 P0*	P1	P2	P3	Mean
1	P0	24.0	36.0	34.6	41.3	32.0
2	P0	36.3	44.2	43.6	43.3	40.7
3	P0	38.2	48.5	44.5	48.0	43.5
4	D	41.7	45.3	52.3	44.2	45.0
5	DP1	45.8	46.8	46.8	37.5	44.5
6	P1	42.4	44.2	49.7	44.2	44.6
7	P2	44.2	45.6	45.6	46.8	45.3
8	P0	40.8	39.8	45.9	49.7	43.4
Mean		39.2	43.8	45.4	44.4	42.4

SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

1	P0	14.4	27.4	33.8	32.9	24.6
2	P0	25.9	28.5	32.3	29.5	28.4
3	P0	33.6	32.7	33.3	33.8	33.4
4	D	35.2	36.3	38.5	38.4	36.7
5	DP1	35.4	37.5	41.3	37.6	37.4
6	P1	40.4	31.9	41.8	34.0	37.7
7	P2	39.0	42.1	33.2	39.7	38.6
8	P0	33.6	32.8	33.9	36.2	34.0
Mean		32.2	33.6	36.0	35.2	33.8

* Duplicated treatment

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72/S/RN/2

SUGAR BEET

Plot	Treatment 1966 and 1967	1972 P0*	P1	P2	P3	Mean
		SUGAR %				
1	P0	15.8	16.6	16.7	16.6	16.3
2	P0	16.5	16.8	17.1	16.6	16.7
3	P0	16.7	16.8	16.5	17.1	16.8
4	D	16.9	17.4	16.5	16.8	16.9
5	DP1	17.0	17.2	17.0	16.9	17.0
6	P1	17.3	17.5	17.4	16.7	17.2
7	P2	17.2	17.2	17.1	17.2	17.2
8	P0	17.3	17.4	16.9	16.9	17.1
Mean		16.8	17.1	16.9	16.8	16.9
		TOTAL SUGAR: TONNES/HECTARE				
1	P0	2.26	4.55	5.63	5.45	4.03
2	P0	4.27	4.80	5.52	4.89	4.75
3	P0	5.61	5.49	5.49	5.78	5.60
4	D	5.96	6.30	6.37	6.45	6.21
5	DP1	6.02	6.45	7.01	6.35	6.37
6	P1	6.98	5.57	7.28	5.69	6.50
7	P2	6.72	7.22	5.67	6.81	6.63
8	P0	5.81	5.70	5.71	6.11	5.83
Mean		5.46	5.76	6.09	5.94	5.74

* Duplicated treatment

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72/S/RN/2

SUGAR BEET

Plot	Treatment 1966 and 1967	1972 P0*	P1	P2	P3	Mean
		TOPS: TONNES/HECTARE				
1	P0	18.8	35.5	40.0	34.8	29.6
2	P0	31.1	37.1	30.5	39.1	33.8
3	P0	37.1	40.0	37.3	35.5	37.4
4	D	43.2	35.5	38.2	42.0	40.4
5	DP1	35.3	41.8	46.8	42.0	40.2
6	P1	38.7	32.8	42.7	35.9	37.7
7	P2	38.9	38.7	38.2	35.0	37.9
8	P0	35.8	33.7	36.4	33.5	35.0
Mean		34.8	36.9	38.8	37.2	36.5
		PLANT NUMBER: THOUSANDS/HECTARE				
1	P0	76.2	77.7	85.7	91.7	81.5
2	P0	92.2	77.7	75.7	74.7	82.5
3	P0	88.7	88.7	85.7	79.7	86.3
4	D	96.7	90.7	98.7	100.7	96.7
5	DP1	88.7	102.7	102.7	82.7	93.1
6	P1	109.1	90.7	104.6	88.7	100.5
7	P2	89.7	99.7	86.7	107.6	94.7
8	P0	94.7	91.7	83.7	79.7	88.9
Mean		92.0	89.9	90.4	88.2	90.5

* Duplicated treatment

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72/S/RN/2

BARLEY AFTER POTATOES

Plot	Treatment 1966 and 1967	1971 P0*	P1	P2	P3	Mean
		GRAIN: TONNES/HECTARE				
1	P0	3.34	6.01	6.46	6.09	5.05
2	P0	5.56	6.03	6.68	6.32	6.03
3	P0	6.00	5.36	5.66	6.02	5.81
4	D	5.87	5.44	5.66	5.78	5.72
5	DP1	6.04	5.32	5.69	5.60	5.74
6	P1	5.33	6.20	5.84	5.83	5.70
7	P2	5.39	5.32	5.48	5.58	5.43
8	P0	5.54	5.57	5.69	5.64	5.60
Mean		5.39	5.65	5.90	5.86	5.64
		STRAW: TONNES/HECTARE				
1	P0	3.49	5.94	6.68	6.61	5.24
2	P0	5.88	7.08	7.24	6.93	6.60
3	P0	6.36	5.97	6.03	6.96	6.34
4	D	6.34	6.72	6.39	6.63	6.49
5	DP1	7.13	7.25	7.06	6.71	7.05
6	P1	7.34	6.81	7.26	7.21	7.19
7	P2	6.79	7.18	7.90	6.78	7.09
8	P0	6.91	6.60	7.34	7.07	6.97
Mean		6.28	6.69	6.99	6.86	6.62

Mean D.M. %: Grain: 82.5
Straw: 64.5

* Duplicated treatment

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72/S/RN/2

BARLEY AFTER SUGAR BEET

Plot	Treatment 1966 and 1967	1971 P0*	P1	P2	P3	Mean
		GRAIN: TONNES/HECTARE				
1	P0	3.44	4.37	5.51	5.34	4.42
2	P0	4.85	5.32	5.22	6.32	5.31
3	P0	5.67	5.51	5.94	5.58	5.67
4	D	5.73	6.08	5.25	5.55	5.67
5	DP1	6.06	6.18	5.62	5.42	5.87
6	P1	5.62	5.39	6.57	6.27	5.89
7	P2	5.52	5.95	6.17	5.95	5.82
8	P0	5.75	5.12	6.18	6.22	5.80
Mean		5.33	5.49	5.81	5.83	5.56
		STRAW: TONNES/HECTARE				
1	P0	3.24	4.14	5.41	5.15	4.23
2	P0	4.63	5.10	5.05	6.13	5.11
3	P0	5.72	6.10	5.90	5.88	5.86
4	D	6.16	6.32	5.41	6.15	6.04
5	DP1	6.93	7.76	6.05	5.50	6.63
6	P1	6.65	5.23	6.75	7.25	6.50
7	P2	5.92	6.68	7.03	7.23	6.56
8	P0	6.10	5.46	6.52	6.52	6.14
Mean		5.67	5.85	6.01	6.23	5.89

Mean D.M. %: Grain: 81.7
Straw: 56.1

* Duplicated treatment

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72/R/RN/1 and 72/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, formerly Ophiobolus graminis) after the different cropping sequences - Highfield and Fosters.

Sponsors: D.A. Boyd, G.W. Cooke, G.V. Dyke, J.R. Moffatt, A.E. Johnston, D.B. Slope, D.J. Hooper.

The 24th year, old grass, leys, sugar beet, wheat, barley.

Seeds: Sugar beet: Klein E sown at 5.6 kg.
Wheat: Joss Cambier sown at 200 kg.
Barley: Julia, seed dressed with ethirimol, sown at 160 kg.

Cultivations, etc. (Highfield and Fosters):

3rd year Treatment Crops:

All-grass ley: PK applied: 19 Nov, 1971. NK applied: 14 Mar, 1972. Cut three times: 22 May, 19 July, 8 Sept. NK applied after first two cuts.

Clover-grass ley: PK applied: 19 Nov, 1971. K applied: 14 Mar, 1972. Cut three times: 22 May, 19 July, 8 Sept. K applied after first two cuts.

Lucerne: PK applied: 19 Nov, 1971. Cut three times: 30 May, 1972, 20 July, 7 Sept.

Sugar beet: Ploughed: 9 - 10 Nov, 1971. K applied: 20 Jan, 1972. NPK applied: 27 Mar. Power harrowed: 17 Apr. Seed drilled: 18 Apr. Singled: 31 May (Highfield), 7 and 19 June (Fosters). Sprayed with menazon at 0.28 kg in 440 l: 30 June. Tractor and side hoed: 6 June. Lifted: 19 Oct.

3rd Test Crop. Barley:

Ground chalk applied (Highfield only): 3 Nov, 1971. Ploughed: 9 - 10 Nov. Power harrowed: 15 Mar, 1972. Seed combine drilled: 16 Mar. N applied: 7 Apr. Sprayed with bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l): 8 May. Combine harvested: 17 Aug.

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72/R/RN/1 and 72/R/RN/2

4th, 5th, 7th and 8th Test Crops. Wheat:
Ploughed: 4 - 6 Oct, 1971. Power harrowed: 25 - 26 Oct. Seed combine drilled: 26 Oct. N applied: 17 - 18 Apr, 1972. Sprayed with dicamba, mecoprop and MCPA ('Tetralex Plus' at 7 l in 220 l): 17 Apr. Combine harvested: 29 Aug.

Permanent Grasses:
The 24th experimental year. Ground chalk applied (Highfield Blocks 2 and 3 only): 3 Nov, 1971. PK applied: 19 Nov. NK applied to 'all-grass' half plots, K to 'clover-grass' half plots: 14 Mar, 1971. Cut three times: 22 May, 19 July, 8 Sept. NK applied to 'all-grass' half plots and K to 'clover-grass' half plots after each cut except the last.

NOTE: Samples were taken in summer from plots in winter wheat for observations on incidence of take-all (Gaeumannomyces graminis, formerly Ophiobolus graminis).

ERRATUM 71/R/RN/1 and 71/R/RN/2 p.66.
Yields of LUCERNE, ALL-GRASS LEY and CLOVER-GRASS LEY should be doubled. Yields of RESEEDED GRASS given on the same page are correct.

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72/R/RN/1 and 72/R/RN/2

TABLES OF MEANS

BARLEY 3RD TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

	1967 - 69 ROTATION					1949-63
	LU	LC	LN	AH	Mean	R*
Mean	6.31	6.39	6.53	6.07	6.32	6.50
N: KG/HA 1972						
0	4.93	5.20	5.42	4.28	4.96	5.77
50	6.50	7.28	7.07	6.37	6.80	7.20
88	6.95	6.89	6.98	6.87	6.92	6.73
126	6.87	6.17	6.66	6.76	6.61	6.31
N: KG/HA 1971						
0	5.88	6.25	6.52	5.85	6.12	6.52
50	6.30	6.39	6.49	5.87	6.26	6.15
100	6.30	6.11	6.49	6.23	6.28	6.46
150	6.77	6.79	6.62	6.33	6.63	6.88
MANURES 1970						
F	6.08	6.17	6.39	5.96	6.15	6.42
D	6.54	6.61	6.67	6.18	6.50	6.59

* AH 1964 - 69

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72/R/RN/1 and 72/R/RN/2

BARLEY 3RD TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

	1967 - 69 ROTATION					1949-63
	LU	LC	LN	AH	Mean	R*
Mean	6.54	6.88	6.74	6.30	6.62	6.72
N: KG/HA 1972						
0	4.82	5.82	5.67	4.39	5.18	5.60
50	6.68	7.02	6.86	6.40	6.74	7.01
88	7.23	7.38	7.47	7.21	7.32	7.25
126	7.45	7.30	6.96	7.21	7.23	7.00
N: KG/HA 1971						
0	6.53	6.79	6.61	6.08	6.50	6.74
50	6.32	6.67	6.67	6.11	6.44	6.66
100	6.72	6.92	6.63	6.66	6.73	6.60
150	6.60	7.14	7.07	6.36	6.79	6.87
MANURES 1970						
F	6.17	6.80	6.73	6.18	6.47	6.55
D	6.92	6.96	6.75	6.42	6.76	6.88

* AH 1964 - 69

https://doi.org/10.23637/ERADOC-1-62

72/R/RN/1 and 72/R/RN/2

WHEAT 4TH TEST CROP, 3RD CEREAL

GRAIN: TONNES/HECTARE

HIGHFIELD

	1966 - 68 ROTATION					1951-62	1951-68		
	LU	LC	LN	AH	Mean	R*	GC**	GN**	Mean
N: KG/HA 1972									
75	3.54	6.00	6.28	5.22	5.26	5.97	5.54	5.35	5.71
126	4.01	5.38	5.68	5.24	5.08	5.69	4.82	5.15	5.34
176	4.23	5.52	5.10	5.13	5.00	5.42	4.91	4.52	5.07
226	4.00	5.12	4.96	4.39	4.62	4.80	4.11	4.83	4.63
Mean	3.95	5.50	5.51	5.00	4.99	5.47	4.84	4.96	5.19

* AH 1963 - 68

** C and N from 1962

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72/R/RN/1 and 72/R/RN/2

WHEAT 4TH TEST CROP, 3RD CEREAL

GRAIN: TONNES/HECTARE

FOSTERS

	1966 - 68 ROTATION					1951-62
	LU	LC	LN	AH	Mean	R*
N: KG/HA 1972						
75	5.03	6.13	6.15	5.63	5.73	5.91
126	5.19	5.43	5.28	5.55	5.36	5.79
176	4.73	4.78	4.98	5.27	4.94	4.86
226	4.21	4.46	4.20	4.55	4.36	4.55
Mean	4.79	5.20	5.15	5.25	5.10	5.28

* AH 1963 - 68

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72/R/RN/1 and 72/R/RN/2

WHEAT 5TH TEST CROP, 4TH CEREAL

GRAIN: TONNES/HECTARE

HIGHFIELD

	1965 - 67					1950 - 67				
	ROTATION									
	LU	LC	LN	AH	Mean	RC*	RN*	GC**	GN**	Mean
N: KG/HA										
1972										
75	4.86	4.29	4.42	4.20	4.44	5.14	3.47	4.61	3.32	4.13
126	5.28	4.03	4.72	4.85	4.72	5.05	3.71	4.66	3.87	4.32
176	4.69	4.35	3.89	4.83	4.44	4.54	3.68	3.97	4.32	4.13
226	4.45	3.81	4.04	3.97	4.07	3.88	3.97	3.76	3.68	3.82
Mean	4.82	4.12	4.27	4.46	4.42	4.65	3.71	4.25	3.80	4.10

* C and N from 1963

** C and N from 1962

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72/R/RN/1 and 72/R/RN/2

WHEAT 5TH TEST CROP, 4TH CEREAL

GRAIN: TONNES/HECTARE

FOSTERS

	1965 - 67 ROTATION					1950 - 67		
	LU	LC	LN	AH	Mean	RC*	RN*	Mean
N: KG/HA								
1972								
75	5.25	5.61	5.78	5.19	5.46	5.60	4.71	5.15
126	5.25	5.29	5.37	5.28	5.29	5.32	4.84	5.08
176	4.65	4.68	4.81	4.82	4.74	4.18	4.05	4.11
226	3.91	4.17	4.29	4.13	4.13	4.03	3.58	3.81
Mean	4.77	4.94	5.06	4.86	4.90	4.78	4.29	4.54

* C and N from 1963

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72/R/RN/1 and 72/R/RN/2

WHEAT 7TH TEST CROP, 5TH CEREAL

GRAIN: TONNES/HECTARE

HIGHFIELD

	1963 - 65 ROTATION					1951 - 68				
	LU	LC	LN	AH	Mean	RC*	RN*	GC**	GN**	Mean
N: KG/HA										
1972										
75	5.30	5.20	5.32	5.12	5.24	4.73	3.64	3.96	5.19	4.38
126	5.48	5.39	4.97	5.67	5.38	4.25	3.99	4.67	4.39	4.33
176	4.92	5.13	4.93	5.16	5.03	4.18	4.39	3.91	4.32	4.20
226	4.42	4.77	4.24	4.74	4.54	3.95	4.48	4.45	3.61	4.12
Mean	5.03	5.12	4.87	5.17	5.05	4.28	4.13	4.25	4.38	4.26

* C and N from 1963

** C and N from 1962

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72/R/RN/1 and 72/R/RN/2

WHEAT 7TH TEST CROP, 5TH CEREAL

GRAIN: TONNES/HECTARE

FOSTERS

	1963 - 65 ROTATION					1951 - 68		
	LU	LC	LN	AH	Mean	RC*	RN*	Mean
N: KG/HA 1972								
75	4.58	4.98	5.04	4.67	4.82	5.04	4.30	4.67
126	4.97	5.13	5.59	5.43	5.28	4.90	4.49	4.70
176	4.76	4.74	4.94	5.18	4.90	4.48	3.95	4.21
226	4.41	4.22	4.27	4.39	4.32	4.58	3.74	4.16
Mean	4.68	4.77	4.96	4.92	4.83	4.75	4.12	4.43

* C and N from 1963

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72/R/RN/1 and 72/R/RN/2

WHEAT 8TH TEST CROP, 6TH CEREAL

GRAIN: TONNES/HECTARE

HIGHFIELD

	1962 - 64 ROTATION				1950-64		1950 - 67		
	LU	LC	LN	AH	R	Mean	GC*	GN*	Mean
N: KG/HA 1972									
75	5.27	5.07	5.31	4.93	5.55	5.23	5.68	5.27	5.48
126	4.62	4.95	4.95	5.09	5.36	4.99	5.36	4.90	5.13
176	5.13	5.06	4.46	5.02	4.72	4.88	4.35	4.59	4.47
226	4.54	4.81	4.40	4.57	4.54	4.57	4.37	4.02	4.20
Mean	4.89	4.97	4.78	4.90	5.04	4.92	4.94	4.70	4.82

* C and N from 1962

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72/R/RN/1 and 72/R/RN/2

WHEAT 8TH TEST CROP, 6TH CEREAL

GRAIN: TONNES/HECTARE

FOSTERS

	1962 - 64 ROTATION				1950 - 64	
	LU	LC	LN	AH	R	Mean
N: KG/HA 1972						
75	5.47	5.12	5.18	4.92	5.47	5.23
126	5.45	5.16	5.37	5.44	5.05	5.29
176	5.04	4.67	4.75	4.92	4.77	4.83
226	4.08	4.51	3.98	4.54	4.17	4.26
Mean	5.01	4.87	4.82	4.96	4.87	4.91

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72/R/RN/1 and 72/R/RN/2

	HIGHFIELD	FOSTERS
	Mean	Mean
LUCERNE, DRY MATTER: TONNES/HECTARE		
	TOTAL OF 3 CUTS	
3rd year	10.49	11.86
ALL-GRASS LEY, DRY MATTER: TONNES/HECTARE		
	TOTAL OF 3 CUTS	
3rd year	11.46	10.74
CLOVER-GRASS LEY, DRY MATTER: TONNES/HECTARE		
	TOTAL OF 3 CUTS	
3rd year	6.96	6.24

RESEEDED GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

	HIGHFIELD			FOSTERS		
	Blocks	RC	RN	Blocks	RC	RN
24th Exptl year	1 & 4	3.90	10.25	1 & 3	5.81	8.78

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72/R/RN/1 and 72/R/RN/2

PERMANENT GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

	GC	GN
HIGHFIELD		
24th Exptl year		
Blocks 1 & 4	2.66	10.30
Block 2	3.63	9.40

SUGAR BEET

HIGHFIELD	POSTERS
Mean	Mean
ROOTS (WASHED): TONNES/HECTARE	
33.1	27.7
SUGAR %	
18.0	18.7
TOTAL SUGAR: TONNES/HECTARE	
5.95	5.17
TOPS: TONNES/HECTARE	
38.7	29.8

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72/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 system 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 35th 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) and 71/W/RN/3(t).

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	251	251
Clover	0	0
Arable with hay	314	251
Arable	314	314
Alternating rotations (last two rotations in order)		
Arable/ley	439	376
Arable with hay/clover	126	126
Ley/arable with hay	251	251
Clover/arable	376	376

Treatments to first test crop, potatoes:-

1. Residues of fumigant applied to potatoes 1969 (Arable and Arable with hay only) on quarter plots: None (O), 448 kg chloropicrin (C).
2. Fresh fumigant (Arable and Arable with hay) on eighth plots, and (Ley and Sainfoin) on quarter plots: None (O), 448 kg chloropicrin plus 5.6 kg aldicarb (F).

Treatments to second test crop, winter wheat:-

1. Residues of fumigant applied to potatoes 1971 on eighth plots: None (O), 448 kg chloropicrin plus 11.2 kg aldicarb (F).
2. Nitrogen on eighth plots: 0, 63, 126, 189 kg N as 'Nitro-Chalk'.

Treatments to first treatment crop, potatoes:-

1. Fresh fumigant (Arable and Arable with hay only) on quarter plots: None (O), 448 kg chloropicrin plus 5.6 kg aldicarb (F).

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NOTE: Winter wheat replaced barley as second test crop. Barley replaced rye as second treatment crop (Arable and Arable with hay) and also carrots as third treatment crop (Arable).

Basal manuring: Winter wheat: 290 kg (0:20:20), barley 415 kg (15:15:15), first year clover: 63 kg N as 'Nitro-Chalk', 189 kg P2O5 as superphosphate, 126 kg K2O as muriate of potash. Second and third year clover: 63 kg N as 'Nitro-Chalk', 189 kg K2O as muriate of potash.

Varieties: Potatoes, first test crop and first treatment crop: Maris Piper.
Winter wheat: Cappelle sown at 180 kg.
Barley: Julia (dressed with ethirimol), sown at 150 kg.
Red Clover: S123 sown at 45 kg.
Ley: Perennial ryegrass S23, Cocksfoot S143, Late flowering red clover, White clover S100: sown at 50 kg.
Hay: Perennial ryegrass S24, Late flowering red clover, Alsike clover: sown at 30 kg.

Cultivations, etc.:-
Treatment crops.
Ley 1st year: Paraquat applied at 0.56 kg ion in 280 l: 9 Sept, 1971. Ploughed: 14 Oct. Deep-tine cultivated: 4 Nov. Ploughed: 29 Feb, 1972. N, P and K applied: 19 Apr. Rotary cultivated: 21 Apr. Rolled, seeds sown: 26 Apr. NK applied: 3 July. Cut once: 16 Aug. NK applied: 18 Aug.
Ley 2nd and 3rd years: NK applied: 9 Mar, 1972, 16 June, 18 Aug. Cut twice: 7 June, 16 Aug.
Clover 1st year: Paraquat applied at 0.56 kg ion in 280 l: 9 Sept, 1971. Ploughed: 14 Oct. Deep-tine cultivated: 4 Nov. Ploughed: 29 Feb, 1972. N, P and K applied: 19 Apr. Rotary cultivated: 21 Apr. Rolled, seed sown: 26 Apr. Cut once: 16 Aug.
Clover 2nd and 3rd years: N and K applied: 9 Mar, 1972. Cut twice: 7 June, 16 Aug.
Potatoes: Paraquat applied at 0.56 kg ion in 280 l: 9 Sept, 1971. Ploughed: 14 Oct. Deep-tine cultivated: 4 Nov. Chloropicrin applied: 15 Dec. Ploughed: 29 Feb, 1972. NPK applied: 24 Mar. Aldicarb applied, all plots rotary cultivated twice, potatoes planted: 29 Mar. Sprayed with linuron at 1.1 kg plus paraquat at 0.42 kg ion in 370 l: 6 May. Sprayed with mancozeb at 1.3 kg

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in 430 l: 5 July. Sprayed with mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l: 27 July. Haulm mechanically destroyed: 14 Sept. Lifted: 20 Sept.

Barley 2nd treatment crop: Deep-tine cultivated twice: 15 Sept, 1971, 3 Nov. Seed combine drilled: 15 Mar, 1972. Seeds hay undersown (AH plots): 26 Apr. Sprayed with bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 280 l): 8 May. Combine harvested: 18 Aug.

Barley 3rd treatment crop: Ploughed: 30 Sept, 1971. Seed combine drilled: 15 Mar, 1972. Sprayed with ioxynil at 0.52 kg plus mecoprop at 1.6 kg in 280 l: 1 June. Combine harvested: 18 Aug.

Seeds hay: Seeds undersown in rye: 22 Apr, 1971. N, P and K applied: 9 Mar, 1972. Cut twice: 7 June, 16 Aug. NK applied: 19 June.

Test crops.

Potatoes 1st test crop: First half corrective K applied: 3 Nov, 1971. Ploughed: 4 Nov. Second half corrective K applied: 29 Nov. Chloropicrin applied: 15 Dec. Ploughed: 29 Feb, 1972. NPK applied: 24 Mar. Aldicarb applied, all plots rotary cultivated, potatoes planted: 29 Mar. Sprayed with linuron at 1.1 kg plus paraquat at 0.42 kg ion in 370 l: 6 May. Sprayed with mancozeb at 1.3 kg in 430 l: 5 July. Sprayed with mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l: 27 July. Haulm mechanically destroyed: 14 - 16 Sept. Lifted: 20 Sept.

Wheat 2nd test crop: Magnesian limestone applied at 5 tonnes, deep-tine cultivated: 6 Oct, 1971. Deep-tine cultivated: 11 Oct. Seed combine drilled: 22 Oct. N applied: 18 Apr, 1972. Sprayed with 2,4-D at 0.7 kg plus dichlorprop at 2.8 kg in 280 l: 27 Apr. Combine harvested: 30 Aug.

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

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72/W/RN/3

TABLES OF MEANS

POTATOES: 1ST TREATMENT CROP

ROTATION

	LE	SA	AH	AR	Mean
	TOTAL TUBERS: TONNES/HECTARE				
DUNG*					
0	41.7	45.3	43.4	36.2	41.6
D	46.4	43.6	38.0	34.1	40.5
FUMIGANTS 1972					
0	39.5	38.8	34.9	27.0	35.1
F	48.5	50.2	46.5	43.3	47.1
Mean	44.0	44.5	40.7	35.2	41.1
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
DUNG*					
0	83.6	90.1	89.3	83.3	86.6
D	93.2	92.0	88.6	76.6	87.6
FUMIGANTS 1972					
0	87.1	89.3	86.9	76.8	85.0
F	89.6	92.7	91.0	83.2	89.1
Mean	88.4	91.0	89.0	80.0	87.1

* Last applied to test crop sugar beet 1965

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72/W/RN/3

POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

	ROTATION			ROTATION		
	LE	SA	Mean	AH	AR	Mean
DUNG*						
O	51.3	52.3	51.8	51.8	45.9	48.8
D	54.4	52.6	53.5	49.3	47.8	48.5
FUMIGANT 1972						
O	50.1	50.3	50.2	47.2	43.7	45.4
F	55.6	54.7	55.1	53.9	50.0	52.0
FUMIGANT 1969						
O				50.1	47.0	48.5
C				51.0	46.7	48.9
Mean	52.8	52.5	52.7	50.5	46.8	48.7

* Last applied to test crop sugar beet 1967

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72/W/RN/3

POTATOES 1ST TEST CROP

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

	ROTATION			ROTATION		
	LE	SA	Mean	AH	AR	Mean
DUNG*						
O	96.3	95.7	96.0	95.5	95.2	95.3
D	95.8	95.6	95.7	95.3	95.0	95.2
FUMIGANT 1972						
O	95.7	95.7	95.7	95.3	94.8	95.1
F	96.4	95.6	96.0	95.5	95.3	95.4
FUMIGANT 1969						
O				95.6	95.1	95.3
C				95.2	95.1	95.2
Mean	96.1	95.6	95.8	95.4	95.1	95.2

* Last applied to test crop sugar beet 1967

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72/W/RN/3

WHEAT 2ND TEST CROP

GRAIN: TONNES/HECTARE

	ROTATION			ROTATION		
	LE	SA	Mean	AH	AR	Mean
N: KG/HA 1972						
0	3.29	3.24	3.26	2.21	2.59	2.40
63	5.16	5.12	5.14	4.72	5.07	4.89
126	4.91	5.10	5.00	4.86	4.90	4.88
183	3.87	4.07	3.97	4.49	4.56	4.53
DUNG*						
O	4.19	4.22	4.21	4.09	3.92	4.01
D	4.43	4.54	4.48	4.04	4.64	4.34
FUMIGANT 1971						
O	4.05	4.06	4.05	4.00	3.98	3.99
F	4.57	4.71	4.64	4.13	4.58	4.36
FUMIGANT 1968						
O				4.04	4.34	4.19
C				4.10	4.22	4.16
Mean	4.31	4.38	4.34	4.07	4.28	4.17

* Last applied to test crop sugar beet 1966

Mean D.M. %: 83.0

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72/W/RN/3

WHEAT 2ND TEST CROP

STRAW: TONNES/HECTARE

	ROTATION			ROTATION		
	LE	SA	Mean	AH	AR	Mean
N: KG/HA 1972						
0	2.67	3.04	2.85	1.90	2.12	2.01
63	5.13	5.30	5.21	4.51	4.73	4.62
126	6.21	6.21	6.21	5.53	5.40	5.46
183	6.18	5.98	6.08	6.02	5.88	5.95
DUNG*						
0	4.96	4.92	4.94	4.64	4.28	4.46
D	5.13	5.35	5.24	4.34	4.79	4.56
FUMIGANT 1971						
0	4.58	4.86	4.72	4.26	4.29	4.27
F	5.51	5.41	5.46	4.72	4.77	4.75
FUMIGANT 1968						
0				4.40	4.52	4.46
C				4.58	4.55	4.56
Mean	5.05	5.13	5.09	4.49	4.53	4.51

* Last applied to test crop sugar beet 1966

Mean D.M. %: 84.7

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72/W/RN/4

MARKET GARDEN

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

Sponsor: A.E. Johnston.

The third year of revised scheme, potatoes and sugar beet.

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

Whole plot dimensions: 8.53 x 5.18. Area harvested: Potatoes - 0.00147, sugar beet - 0.00127.

Superphosphate treatments (applied to whole plots with confounding of certain two and three factor interactions):-
Series A: Potatoes: None (0), 188 kg P205 (P).
Series B: Sugar beet: None (0), 126 kg P205 (P).

Basal applications:-
Series A: Potatoes: Manures: 2.5 tonnes ground chalk, 420 kg muriate of potash (60% K20), 1170 kg 'Nitro-Chalk' , 605 kg Epsom salts (16% MgO), Weedkillers: Paraquat at 0.56 kg ion in 280 l. Linuron at 1.1 kg plus paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.
Series B: Sugar beet: Manures: 2.5 tonnes ground chalk, 630 kg muriate of potash (60% K20) in autumn, 750 kg (25:0:16), 590 kg Epsom salts (16% MgO), boron at 6.7 kg B203 in 400 l. Weedkiller: Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.

Varieties: Potatoes: Pentland Crown.
Sugar beet: Klein E sown at 11 kg.

Cultivations, etc.:
Series A: Potatoes: Paraquat applied: 9 Sept, 1971. Ground chalk applied: 4 Oct. Ploughed: 15 Oct. Deep-tine cultivated: 3 Nov. N and K applied: 23 Mar, 1972. P treatments applied: 12 Apr. Mg applied: 13 Apr. Rotary cultivated: 17 Apr. Potatoes planted: 18 Apr. Linuron and paraquat applied: 8 May. Rotary ridged: 7 June. Fungicide applied: 6 July. Fungicide plus

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insecticide applied: 27 July. Sprayed with undiluted BOV at 200 l: 22 Sept. Haulm mechanically destroyed: 27 Sept. Lifted: 2 Oct.

Series B: Sugar beet: Ground chalk applied: 4 Oct, 1971. Deep-tine cultivated: 6 Oct. K applied: 27 Oct. Deep-tine cultivated: 3 Nov. Ploughed: 15 Nov. NK, P, and Mg applied: 22 Mar. Power harrowed, seed drilled: 23 Mar. Weedkiller applied: 3 May. Singled: 19 - 22 May. Boron spray applied: 9 June. Insecticide applied: 29 June. Lifted: 6 - 8 Nov.

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72/W/RN/4

TABLES OF MEANS

SERIES A

POTATOES

Organic 1942-61*	Organic 1962-67	P0K0 0	P0K0 P	P1K1 0	P1K1 P	P2K2 0	P2K2 P
TOTAL TUBERS: TONNES/HECTARE							
0	0			42.0	44.7	30.5	48.5
S1	0					52.2**	58.7**
S2	0					61.8**	58.0**
T1	0					54.5**	56.9**
T2	0					58.3**	58.5**
D1	D1	40.2	54.3	43.0	49.7		
D2	D2	58.8	62.7	52.6	46.7		
C1	D1	50.9	52.3	40.3	54.6		
C2	D2	58.5	56.5	49.6	64.6		
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE							
0	0			97.7	97.9	96.8	97.7
S1	0					97.7**	97.8**
S2	0					98.0**	98.0**
T1	0					97.8**	97.8**
T2	0					98.7**	98.1**
D1	D1	97.3	98.1	97.4	96.8		
D2	D2	98.3	98.8	98.2	98.1		
C1	D1	97.9	97.0	97.1	98.4		
C2	D2	99.0	99.0	98.5	97.9		

* Last applied to leeks 1961/62
** P1K1 1962-65

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72/W/RN/4

SERIES B

SUGAR BEET

Organic 1942-61	Organic 1962-64	Organic 1966-67	P0K0 O	P0K0 P	P1K1 O	P1K1 P	P2K2 O	P2K2 P
ROOTS (WASHED): TONNES/HECTARE								
0	0	0			42.5	42.2	42.5	46.6
0	0	PT			46.8	44.3	44.1	46.5
S1	0	0	45.7*	45.9*				
S2	0	0	44.6*	47.8*				
T1	0	0	52.7*	47.2*				
T2	0	0	49.1*	45.6*				
D1	D1	D1	48.9	49.4	53.8	36.0		
D1	D1	0	51.3	47.5	52.7	34.9		
D2	D2	D2	44.2	49.2	47.1	55.7		
D2	D2	0	48.7	46.1	49.0	50.3		
C1	D1	D1	49.5	52.4	49.8	51.2		
C2	D2	D2	49.8	46.1	52.9	52.5		
SUGAR %								
0	0	0			17.4	17.4	17.0	17.5
0	0	PT			17.5	17.4	17.6	17.3
S1	0	0	17.1*	17.4*				
S2	0	0	17.3*	17.1*				
T1	0	0	17.4*	17.1*				
T2	0	0	17.1*	17.4*				
D1	D1	D1	17.5	17.2	17.3	17.4		
D1	D1	0	17.1	17.4	17.2	17.1		
D2	D2	D2	17.1	17.1	16.7	17.1		
D2	D2	0	17.0	17.0	17.6	17.0		
C1	D1	D1	17.8	17.3	17.5	17.3		
C2	D2	D2	16.9	16.6	17.1	17.3		

* P1K1 1962-64

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72/W/RN/4

SERIES B

SUGAR BEET

Organic 1942-61	Organic 1962-64	Organic 1966-67	P0K0 0	P0K0 P	P1K1 0	P1K1 P	P2K2 0	P2K2 P
TOTAL SUGAR: TONNES/HECTARE								
0	0	0			7.41	7.36	7.22	8.18
0	0	PT			8.18	7.69	7.79	8.05
S1	0	0	7.79*	7.97*				
S2	0	0	7.69*	8.19*				
T1	0	0	9.19*	8.04*				
T2	0	0	8.41*	7.93*				
D1	D1	D1	8.55	8.50	9.29	6.27		
D1	D1	0	8.78	8.27	9.06	5.95		
D2	D2	D2	7.53	8.39	7.86	9.53		
D2	D2	0	8.27	7.82	8.64	8.55		
C1	D1	D1	8.83	9.06	8.75	8.85		
C2	D2	D2	8.43	7.65	9.05	9.11		
TOPS: TONNES/HECTARE								
0	0	0			37.6	39.2	30.0	36.5
0	0	PT			36.5	32.7	31.1	38.6
S1	0	0	39.7*	38.1*				
S2	0	0	39.2*	40.2*				
T1	0	0	41.3*	46.1*				
T2	0	0	39.2*	36.5*				
D1	D1	D1	38.6	38.6	44.0	29.0		
D1	D1	0	40.8	44.0	34.3	24.7		
D2	D2	D2	31.1	32.2	36.5	37.6		
D2	D2	0	34.3	38.6	34.3	36.5		
C1	D1	D1	34.3	41.8	33.3	37.0		
C2	D2	D2	34.3	30.6	33.3	36.5		

* P1K1 1962-64

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72/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 seventeenth year of the rotation, barley, ley, potatoes, winter wheat, kale. The thirteenth year of the same rotation on the additional plots. The sixteenth 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) and 69-71/R/RN/5.

Whole plot dimensions: 2.13 x 2.44.

Seed: Winter wheat: Maris Nimrod sown at 270 kg.
Kale: Thousand Headed.
Barley: Deba Abed sown at 170 kg (Midas sown at 150 kg on additional plots), seed dressed with ethirimol in each case.
Grass-clover ley: R.V.P. Italian Ryegrass and Dorset Marl Red Clover.
Potatoes: King Edward.

Cultivations, etc.:
Winter wheat: Plots dug by hand: 14 - 16 Sept, 1971. Balancing Mg applied to half plots: 16 Sept. Test Mg applied to additional plots: 27 Sept. P, K and S applied, plots rotary cultivated lightly ('Nil' plot only on additional plots), seed drilled: 11 Oct. Ca applied: 29 Oct. First half N dressing applied: 23 Mar, 1972. Trace element spray applied, all N applied to additional plots, second half N dressing applied: 25 Apr. Sprayed with 2,4-DP plus MCPA ('Mephetol Plus' at 5.6 l in 900 l): 27 Apr. Harvested: Additional plots - 15 Aug, remainder - 23 Aug.
Kale: FYM applied, plots dug by hand: 3 Nov, 1971. P, K, Ca, Mg and S applied: 28 Feb, 1972. First half N dressing applied to additional plots, all N to remainder, plots rotary cultivated, seed drilled: 29 Mar. Trace element spray and second half N dressing applied: 8 June. Sprayed with dimethoate at 0.17 kg in 340 l: 3 Aug. Harvested: 25 Oct.

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Barley: Plots dug by hand: 3 - 4 Nov, 1971. P, K, Ca, Mg and S applied: 28 Feb, 1972. N applied, plots rotary cultivated, seed drilled: 23 Mar. Trace element spray applied: 8 June. Harvested: Additional plots - 14 Aug, remainder - 23 Aug.

Grass-clover ley: Seed drilled in barley stubble: 16 Aug, 1971. P, K, Ca, Mg and S applied: 8 Dec. N applied: 23 Mar, 1972. Trace element spray applied: 25 Apr. Cut three times: 25 May, 24 July, 3 Oct.

Potatoes: FYM applied and plots dug by hand: 4 - 5 Nov, 1971. P, K, Ca, Mg and S applied: 28 Feb, 1972. First half N dressing applied to additional plots, all N to remainder, plots rotary cultivated, Mg applied to half plots, potatoes planted: 24 Apr. Trace element spray and second half N dressing applied to additional plots: 8 June. All plots sprayed with mancozeb at 1.4 kg in 340 l, receiving at the same time menazon ('Saphi-Col' at 0.7 l): 13 July. All plots sprayed with mancozeb at 1.4 kg in 340 l: 1 Aug. Lifted: Plots of the main experiment with neither K nor FYM and no fertiliser plot of additional plots: 8 Aug. Remaining plots lifted: Additional plots - 8 Sept, remainder - 15 Sept.

Permanent grass: P and K applied: 8 Dec, 1971. FYM applied: 28 Feb, 1972. N applied: 23 Mar, 18 May, 24 July. Cut three times: 18 May, 24 July, 24 Oct.

NOTES: (1) Yields of dry matter were obtained for each crop.
(2) The percentages of N, P and K were measured in each crop.
(3) The percentage of Mg in potato leaves was measured on main and additional plots and the percentage Mg in tubers on the main plots.
(4) The percentage of K in potato leaves was measured on main and additional plots.

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72/R/RN/5

TABLES OF MEANS

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

Treatment	WINTER WHEAT GRAIN	WINTER WHEAT STRAW	KALE: FRESH WEIGHT	BARLEY GRAIN	BARLEY STRAW	LEY: DRY MATTER 1st cut	LEY: DRY MATTER 2nd cut	LEY: DRY MATTER 3rd cut	LEY: DRY MATTER Total of 3 cuts	POTATOES: TOTAL TUBERS	PERMANENT GRASS: DRY MATTER 1st cut	PERMANENT GRASS: DRY MATTER 2nd cut	PERMANENT GRASS: DRY MATTER 3rd cut	PERMANENT GRASS: DRY MATTER Total of 3 cuts
0	3.09	3.96	14.0	3.08	2.45	2.27	1.24	1.01	4.52	8.5	0.61	1.15	0.40	2.16
N1	2.98	4.61	14.4	4.65	4.18	3.51	1.01	0.51	5.03	8.2	1.59	1.59	0.97	4.15
P	4.99	5.95	18.8	3.54	2.87	2.13	1.06	0.31	3.50	5.0	0.54	1.00	0.23	1.77
N1P	1.69	3.67	35.8	4.68	3.72	4.10	1.09	0.26	5.45	6.7	2.12	1.87	1.25	5.24
K	5.11	6.56	7.8	3.22	2.58	2.54	1.70	1.60	5.84	25.8	0.83	1.27	0.48	2.58
N1K	6.20	8.74	4.8	4.88	4.44	4.55	1.21	0.93	6.69	30.9	2.58	2.42	1.28	6.28
PK	5.12	7.08	17.1	3.34	2.45	3.20	1.83	1.95	6.98	32.6	0.77	1.77	0.48	3.02
N1PK	7.12	9.45	37.5	4.75	3.94	4.58	1.51	2.06	8.15	39.9	2.45	2.35	1.13	5.93
N2PK	7.42	11.56	46.2	6.18	6.00	5.72	1.51	1.29	8.52	42.4	4.19	3.04	1.94	9.17
D	6.19	7.19	31.0	4.21	3.38	4.05	1.81	2.47	8.33	35.4	3.38	1.70	0.82	5.90
N1PKD	7.34	10.65	52.3	5.85	5.28	5.64	1.60	1.48	8.72	46.1	4.83	2.44	1.52	8.79
N2PKD	7.51	12.12	65.0	6.26	6.62	6.52	1.53	0.87	8.92	54.8	4.34	4.07	2.37	10.78
Mean D.M. %:	85.8	65.4		81.7	47.5	25.5	29.6	25.3	26.8		26.7	29.3	33.2	29.7

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72/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

Treatment	WINTER WHEAT GRAIN	WINTER WHEAT STRAW	KALE: FRESH WEIGHT	BARLEY GRAIN	BARLEY STRAW	LEY: DRY MATTER 1st cut	LEY: DRY MATTER 2nd cut	LEY: DRY MATTER 3rd cut	LEY: DRY MATTER Total of 3 cuts	POTATOES: TOTAL TUBERS
None	4.73	6.00	21.4	2.66	2.73	2.18	1.80	1.40	5.38	9.6
N2PK	8.14	10.35	52.3	6.99	7.47	6.03	1.78	1.44	9.30	39.2
N2 PK Mg Ca	7.11	10.42	54.5	6.82	6.69	5.94	2.35	2.69	10.98	37.5
N2 PK Mg S	7.88	10.31	60.6	6.88	7.25	5.02	1.59	1.02	7.63	39.4
N2 PK Ca S	6.85	9.33	57.1	7.01	7.25	6.05	2.14	1.99	10.18	38.2
N2 PK Mg Ca S	7.41	10.35	56.7	7.01	7.62	5.92	2.18	2.84	10.94	38.4
N2 PK Mg Ca S TE	7.58	9.73	60.2	6.99	7.98	5.79	2.40	2.72	10.91	37.7
Mean D.M. %:	82.3	67.1		80.2	67.4	23.8	28.3	23.2	25.1	

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72/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 13th 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/W/RN/6.

Whole plot dimensions: 2.74 x 2.13.

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 Dorset Marl Clover.
Potatoes: Desiree.

Cultivations, etc.:-
Winter oats: Balancing Mg applied: 3 Sept, 1971. Plots dug by hand: 17 Sept. P and K applied, seed drilled: 15 Oct. First N applied: 2 Mar, 1972. Sprayed ioxynil at 0.5 kg with mecoprop at 1.6 kg in 450 l: 13 Apr. Second N applied: 20 Apr. Harvested: 8 Aug.
Sugar beet: FYM applied, plots dug by hand: 1 Dec, 1971. P and K applied: 2 Mar, 1972. First N applied, rotary cultivated, Mg applied to half plots, seed drilled: 29 Mar. Second N applied, singled: 19 May. Sprayed menazon at 0.28 kg in 450 l on one occasion: 27 June. Sprayed menazon at 0.28 kg in 340 l on two occasions: 14 July, 3 Aug. Lifted: 17 Oct.
Barley: Balancing Mg applied: 1 Dec, 1971. Plots dug by hand: 2 Dec. P and K applied, first N applied, seed drilled: 2 Mar, 1972. Second N applied: 26 Apr. Sprayed dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l) in 340 l: 17 May. Harvested: 16 Aug.
Grass-clover ley: Seed drilled in barley stubble: 6 Aug, 1971. P and K applied: 1 Dec. N applied: 2 Mar, 1972. Cut four times: 28 Oct, 1971, 2 June, 1972, 25 July, 2 Oct.

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Potatoes: FYM applied, plots dug by hand: 1 Dec, 1971. P and K applied: 2 Mar, 1972. First N applied, Mg applied to half plots, rotary cultivated, potatoes planted, earthed up: 26 Apr. Second N applied: 4 June. Sprayed menazon at 0.28 kg in 450 l: 27 June. Sprayed mancozeb at 1.3 kg plus menazon at 0.28 kg in 340 l: 14 July. Sprayed mancozeb at 1.3 kg in 340 l: 3 Aug, Lifted plots without K: 8 Aug. Remaining plots lifted: 4 Sept.
Permanent grass: P and K applied: 1 Dec, 1971. FYM and first N applied: 2 Mar, 1972. N applied: 19 May, 25 July. Cut three times: 19 May, 25 July, 18 Oct.

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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72/W/RN/6

TABLES OF MEANS

TONNES/HECTARE

Treatment	OATS GRAIN	OATS STRAW	SUGAR BEET ROOTS	SUGAR BEET TOPS	BARLEY GRAIN	BARLEY STRAW
None	1.87	2.19	15.0	7.8	2.01	1.69
N1	3.72	4.65	21.5	17.4	2.76	2.96
P	1.65	1.84	20.0	11.0	2.16	1.74
N1P	4.49	5.79	15.4	14.7	1.58	2.49
K	2.05	2.78	18.4	8.7	2.29	1.99
N1K	4.06	5.40	32.8	18.6	4.59	4.28
PK	1.80	2.22	18.1	9.5	2.27	1.95
N1PK	4.15	6.08	29.0	18.8	5.09	5.26
N2PK	4.33	6.89	31.4	24.8	5.44	7.22
D	2.65	3.53	28.7	14.9	3.75	3.35
N1PKD	4.25	6.68	39.3	27.3	6.18	6.34
N2PKD	4.92	7.85	43.7	37.4	6.46	6.73
Mean D.M. %:	79.5	46.7			83.1	72.8

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TONNES/HECTARE

Treatment	LEY: DRY MATTER 1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	POTATOES: TOTAL TUBERS	OLD GRASS: DRY MATTER 1st cut	2nd cut	3rd cut	Total of 3 cuts
None	0.42	2.30	0.58	0.87	4.17	9.6	1.06	0.46	0.28	1.80
N1	0.32	3.74	0.55	0.50	5.11	10.3	2.80	1.61	1.46	5.87
P	0.40	2.48	0.60	0.83	4.31	11.2	0.79	0.41	0.19	1.39
N1P	0.38	4.21	0.57	0.31	5.47	12.9	2.74	1.58	1.42	5.74
K	0.73	4.12	1.61	1.85	8.31	9.8	1.48	1.12	0.44	3.04
N1K	0.80	5.57	1.07	1.58	9.02	22.6	3.76	1.52	1.56	6.84
PK	0.87	4.76	1.52	1.62	8.77	13.3	1.31	0.94	0.43	2.68
N1PK	0.84	5.31	0.99	1.46	8.60	23.4	3.83	1.30	1.52	6.65
N2PK	0.67	6.26	1.14	0.96	9.03	23.4	4.78	1.38	1.77	7.93
D	0.84	4.67	1.19	1.64	8.34	26.8	2.43	0.77	0.49	3.69
N1PKD	1.26	5.84	1.11	1.55	9.76	27.7	4.83	1.28	1.83	7.94
N2PKD	0.85	6.15	1.12	0.83	8.95	40.6	4.64	1.23	1.96	7.83
Mean D.M. %:	23.3	27.3	29.5	24.3	26.1		23.6	34.8	30.1	29.5

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72/R/RN/7

RESIDUAL PHOSPHATE

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

Sponsor: G.E.G. Mattingly.

The thirteenth 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/R/RN/7.

Whole plot dimensions:-
Great Field IV: 4.27 x 19.3. 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.

Standard applications:
Potatoes: Weedkiller: Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 440 l. Fungicide: Mancozeb at 1.3 kg in 440 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with the fungicide on the second occasion.
Barley: Ground chalk at 2.9 tonnes. Weedkiller: Ioxynil, bromoxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l).
Swedes: Weedkiller: Paraquat at 0.56 kg ion in 220 l.

Seed: Potatoes: Majestic chitted Scotch seed.
Barley: Julia, dressed with ethirimol, sown at 160 kg.
Swedes: Wilhelmsburger, dressed with gamma BHC and captan, sown at 0.4 kg.

Cultivations, etc. (both fields):- Ploughed: 10 Nov, 1971.
Potatoes: Fertilisers applied: 19 Apr, 1972. Plots rotary cultivated, potatoes machine planted: 20 Apr. Weedkiller applied: 17 May. Grubbed and rotary ridged: 15 June. Fungicide applied: 11 July, 21 July, 10 Aug. Insecticide applied: 21 July. Sprayed with undiluted BUV at 200 l: 5 Oct. Lifted: 25 Oct.

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Barley: Chalk applied: 1 Nov, 1971. Treatment P fertilisers applied: 18 Mar, 1972. Seed combine drilled: 20 Mar. Weedkiller applied: 17 May. Combine harvested: 24 Aug.
Swedes: Weedkiller applied: 8 Oct, 1971. Treatment P and basal K applied: 5 May, 1972. Basal N applied: 19 May. Seed drilled: 24 May. Singled: 26 June - 17 July. Lifted: Great Field IV - 8 Nov, Sawyers I - 13 Nov.

Standard errors per plot.

Sawyers I:

Potatoes, total tubers, tonnes/hectare:	2.90 or 10% (11 d.f.)
Barley, grain, tonnes/hectare:	0.198 or 3.3% (11 d.f.)
Swedes, roots, tonnes/hectare:	3.17 or 14.2% (11 d.f.)

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72/R/RN/7

TABLES OF MEANS

POTATOES

Treatment (T)	TOTAL TUBERS: TONNES/HECTARE Great Field IV	Sawyers I	% WARE: 3.81 CM (1.5 INCH) Great Field IV	Sawyers I
0	22.7	17.1	95.2	95.7
A1	33.6	24.2	98.3	95.4
A2	42.1	29.8	97.6	95.8
A3	42.0	38.1	96.9	97.0
A4	44.3	39.2	97.6	96.7
T1	38.1	30.3	97.5	96.4
T2	40.2	35.2	96.6	97.1
R2	31.5	23.9	97.6	96.0
R3	37.3	30.6	98.1	96.9
R4	37.4	31.7	97.5	96.3
G1	27.3	22.9	97.9	96.4
S1	28.2	23.5	97.7	96.4
Mean	35.4	28.9	97.4	96.3

Sawyers I only

STANDARD ERROR OF DIFFERENCES
T 2.90

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BARLEY

Treatment (T)	GRAIN: TONNES/HECTARE Great Field IV	Sawyers I	STRAW: TONNES/HECTARE Great Field IV	Sawyers I
0	4.31	5.48	4.42	4.16
A1	4.32	6.12	4.23	4.79
A2	4.41	6.19	4.67	4.56
A3	3.57	6.45	5.48	4.71
A4	3.93	6.49	5.38	4.88
T1	3.74	6.04	4.41	4.43
T2	3.77	6.32	6.15	4.57
R2	3.73	5.80	4.36	4.33
R3	3.04	6.23	5.06	4.76
R4	3.95	6.19	5.16	4.67
G1	4.90	5.55	4.49	4.28
S1	4.27	5.63	4.29	4.13
Mean	4.00	6.04	4.84	4.52

Sawyers I only

STANDARD ERROR OF DIFFERENCES
T 0.198

Mean D.M. %:	86.0	86.0	83.8	83.8

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72/R/RN/7

SWEDES, ROOTS: TONNES/HECTARE

Treatment (T)	Great Field IV	Sawyers I
0	4.9	4.2
A1	14.1	24.0
A2	28.8	28.8
A3	30.6	30.4
A4	31.0	31.2
T1	21.3	28.0
T2	27.3	28.4
R2	16.2	17.8
R3	24.6	24.3
R4	24.9	28.5
G1	8.3	8.4
S1	7.8	13.6
Mean	20.0	22.3

Sawyers I only

STANDARD ERROR OF DIFFERENCES
T 3.17

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72/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 12th year, beans, wheat, potatoes, barley.

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

Whole plot dimensions: 12.8 x 15.2. Area harvested: Beans: 0.00488, winter wheat and barley: 0.00434, potatoes: 0.00217.

Seed: Beans: Maris Bead sown at 220 kg.
Wheat: Cappelle sown at 200 kg.
Potatoes: Pentland Crown, Rothamsted once grown.
Barley: Julia, seed dressed ethirimol, sown at 160 kg.

Cultivations, etc.:-

Spring beans: Barley straw burnt on B plots: 25 Aug, 1971. Paraquat applied at 0.56 kg ion in 220 l to G sub plots: 10 Sept. B plots deep-tine cultivated once, T plots twice: 4 Nov. R plots rotary cultivated, P and C plots ploughed: 8 Nov. P, R, T, B and C plots power-harrowed, A plots rotary cultivated: 20 Mar, 1972. All plots placement drilled: 21 Mar. Simazine applied at 1.1 kg in 220 to SX, A, B and C plots: 2 May. M plots tractor hoed: 4 May. M plots mechanically weeded: 9 May. Dinoseb acetate ('Ivosit' at 6.7 kg) applied in 440 l to SY plots: 19 May. M plots tractor hoed: 25 May, 7 June. Phorate applied at 1.1 kg: 16 June. Ends of all plots sprayed with demeton-s-methyl at 0.25 kg in 440 l: 5 Aug. Combine harvested: 26 Sept.

Wheat: Bean straw raked off B plots (insufficient to burn): 6 Sept, 1971. Paraquat applied at 0.56 kg ion in 220 l to G sub plots: 10 Sept. B plots deep-tine cultivated once, T plots twice: 8 Oct. P, A and C plots ploughed: 11 Oct. P, T, A, B and C plots spring-tine cultivated, R plots rotary cultivated, seed combine drilled: 15 Oct. All plots harrowed: 22 Mar, 1972. All plots rolled: 25 Mar. N applied: 19 Apr. H sub plots sprayed 0.63 kg ioxynil and 1.9 kg mecoprop in 220 l: 28 Apr. Combine harvested: 31 Aug.

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Potatoes: Wheat straw burnt on B plots: 7 Sept, 1971. Paraquat applied to G sub plots: 10 Sept. T plots deep-tine cultivated twice: 4 Nov. P and C plots ploughed, R plots rotary cultivated: 8 Nov. Basal NPK applied, P and T plots spring-tine cultivated: 18 Apr, 1972. P and T plots spring-tine cultivated: 19 Apr. R, A, B and C plots rotary cultivated, potatoes machine planted: 19 - 20 Apr. All ridges rolled: 2 May. M plots chain harrowed and grubbed: 9 May. S plots sprayed linuron at 0.84 kg and paraquat at 0.42 kg ion in 440 l: 17 May. M and Y plots grubbed: 14 June. M and Y plots rotary ridged: 15 June. Sprayed three times with mancozeb at 1.34 kg in 440 l: 11 July, 21 July, 10 Aug. Demeton-s-methyl at 0.25 kg was included with the second spray. Sprayed with undiluted BOV at 200 l: 20 Sept. Lifted: 7 - 9 Nov.

Barley: Spring-tine cultivated: 12 Oct, 1971. Sodium trichloroacetate applied at 20 kg in 220 l: 21 Oct. Spring-tine cultivated twice: 28 Oct, 17 Nov. Sodium trichloroacetate applied at 20 kg in 220 l: 2 Dec. Spring-tine cultivated: 10 Dec. T and C plots deep-tine cultivated twice, R plots rotary cultivated, P plots ploughed: 13 Dec. A plots rotary cultivated, P, R, T, B and C plots power-harrowed: 20 Mar, 1972. Seed combine drilled: 21 Mar. Rolled: 22 Mar. H sub-plots sprayed 0.53 kg ioxynil and 1.6 kg mecoprop in 220 l: 17 May. Combine harvested: 18 Aug.

NOTES: (1) Docks were hand pulled in potatoes and thistles in all crops. Weed counts were taken.

(2) Two rows of potatoes per sub-plot were lifted for yield by elevator digger (not 4 as in previous years), then the 2 adjacent rows were lifted by harvester. Yields are presented for the elevator digger only.

Standard errors per plot.

Spring beans:	Grain, tonnes/hectare:	Whole plot:	0.298 or 9.3% (8 d.f.)
		Sub plot:	0.344 or 10.8% (9 d.f.)
Spring wheat:	Grain, tonnes/hectare:	Whole plot:	0.362 or 5.4% (8 d.f.)
		Sub plot:	0.291 or 4.4% (8 d.f.)
Potatoes, Total tubers, tonnes/hectare:		Whole plot:	3.48 or 9.4% (8 d.f.)
		Sub plot:	2.74 or 7.4% (9 d.f.)
Barley:	Grain, tonnes/hectare:	Whole plot:	0.164 or 2.4% (8 d.f.)
		Sub plot:	0.275 or 4.0% (9 d.f.)

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72/R/RN/8

TABLES OF MEANS

SPRING BEANS

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	3.47	2.99	3.12	3.19
WEEDKILLER (W)				
M	3.64	2.97	3.37	3.33
SX	3.10	2.95	2.64	2.90
SY	3.68	3.05	3.34	3.35
PARAQUAT SPRAY (P)				
O	3.52	2.89	3.01	3.14
G	3.42	3.09	3.22	3.24

STANDARD ERRORS OF DIFFERENCES

	C	W	P	C W	C P
	0.172	0.172	0.115	0.298	0.222
Unless same level of C					0.199

A	AG	BG	C	CG
2.95	2.93	2.94	3.17	3.41

Grand mean: 3.16
Mean D.M. %: 83.2

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72/R/RN/8

WINTER WHEAT

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	7.07	6.56	6.40	6.68
WEEDKILLER 1971 (W)				
M	6.98	6.50	6.58	6.68
SX	7.07	7.06	6.53	6.88
SY	7.17	6.11	6.09	6.46
PARAQUAT SPRAY 1972 (P)				
O	6.94	6.38	6.18	6.50
G	7.21	6.73	6.62	6.85
HORMONE SPRAY 1972 (H)				
O	6.49	6.65	6.41	6.52
H	6.88	7.12	6.51	6.83

STANDARD ERRORS OF DIFFERENCES

	C	W	P	H	C W	C P	C H
	0.209	0.209	0.097	0.097	0.362	0.241	0.241
Unless same level of C						0.168	0.168

A	AG	AH	AGH	BGH	CH	CGH
7.35	6.93	6.56	7.57	7.12	7.52	6.67

Grand mean: 6.78
Mean D.M. %: 84.5

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72/R/RN/8

POTATOES

TOTAL TUBERS: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	39.5	34.7	37.1	37.1
WEEDKILLER (W)				
M	42.3	34.0	34.5	37.0
S	36.4	35.7	34.4	35.5
SY	39.8	34.6	42.3	38.9
PARAQUAT SPRAY (P)				
O	37.3	35.3	35.7	36.1
G	41.7	34.2	38.5	38.1

STANDARD ERRORS OF DIFFERENCES

	C	W	P	C W	C P
	2.01	2.01	0.91	3.48	2.30
Unless same level of C					1.58

A	AG	BG	C	CG
32.1	32.4	33.7	43.6	40.7

Grand mean: 36.8

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72/R/RN/8

POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

CULTIVATION (C)

	P	R	T	Mean
Mean	95.0	96.2	95.8	95.7
WEEDKILLER (W)				
M	96.8	97.3	95.5	96.6
S	93.2	95.2	95.3	94.6
SY	95.1	96.0	96.5	95.9
PARAQUAT SPRAY (P)				
O	94.6	96.1	95.5	95.4
G	95.5	96.3	96.1	96.0

A	AG	BG	C	CG
97.3	96.2	94.0	95.6	95.1

Grand mean: 95.6

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72/R/RN/8

BARLEY

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	6.88	6.82	6.80	6.83
WEEDKILLER 1971 (W)				
M	6.87	6.95	6.85	6.89
S	6.81	6.70	6.56	6.69
SY	6.95	6.82	7.00	6.92
HORMONE SPRAY 1972 (H)				
O	6.89	6.81	6.67	6.79
H	6.87	6.84	6.93	6.88

STANDARD ERRORS OF DIFFERENCES

	C	W	H	C W	C H
	0.095	0.095	0.092	0.164	0.147
Unless same level of C					0.158

A	AH	BH	CH
6.31	6.64	6.78	6.93

Grand mean: 6.81
Mean D.M. %: 82.7

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72/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.

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

For previous years see 63/C/10(t), 64-65/C/9, 66/C/7, 67-68/C/5 and 69-71/R/RN/9.

Whole plot dimensions: 17.1 x 4.27. Area harvested: Winter wheat: 0.00479, Spring wheat: 0.00473.

Seed: Winter wheat: Cappelle sown at 200 kg.
Spring wheat: Kolibri sown at 190 kg.
Oats: Nanod sown at 190 kg.
Beans: Maris Bead sown at 220 kg.

Cultivations, etc.:- All plots sprayed with paraquat at 0.56 kg ion in 220 l: 10 Sept, 1971. Ploughed: 22 Sept.
Winter wheat: Seed combine drilled: 8 Oct, 1971. N applied: 4 Apr, 1972. Sprayed with ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l: 28 Apr. Combine harvested: 31 Aug.
Spring wheat: Seed combine drilled: 22 Mar, 1972. N applied: 4 Apr. Sprayed with ioxynil at 0.53 kg and mecoprop at 1.6 kg in 220 l: 19 May. Combine harvested: 5 Sept.
Oats: Seed combine drilled: 18 Mar, 1972. N applied: 4 Apr. Combine harvested: 31 Aug.
Beans: Seed placement drilled: 22 Mar, 1972. Sprayed with demeton-s-methyl at 0.25 kg in 440 l: 24 June. Combine harvested: 27 Sept.

NOTES: (1) Yields were taken for winter and spring wheat only (crop sequences 2, 3, 4 and 6).
(2) Estimates were made in spring and summer of incidence of take-all (Gaeumannomyces graminis formerly Ophiobolus graminis) and eyespot (Cercosporella herpotrichoides).

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72/R/RN/9

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CROP SEQUENCE

Crop in	2	3	4	6	
1963	W	W	BE	W	
1964	W	BE	O	W	
1965	BE	O	W	W	
1966	O	W	W	W	
1967	W	W	W	W	
1968	W	W	BE	W	
1969	W	BE	O	W	
1970	BE	O	W	W	
1971	O	W	W	W	Mean
		WINTER WHEAT			
	5.68	5.44	5.80	5.30	5.55
		SPRING WHEAT			
	3.06	2.10	3.35	2.42	2.73

Mean D.M. %: Winter wheat: 85.6
Spring wheat: 82.5

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72/R/RN/11

IRRIGATION

Object: To study the effects of different timing and intensity 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, J.V. Lake, B.K. French.

The ninth year, winter wheat, kale.

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) and 71/R/RN/11(t).

Design (each crop): 4 randomised blocks of 4 plots, split into half and quarter plots.

Whole plot dimensions:
Winter wheat: 30.4 x 13.1. Sub plot area harvested: 0.00347.
Kale: 15.2 x 32.0. Sub plot area harvested: 0.00098.

Treatments:
Winter wheat: All combinations of:-
Whole plots: 1. Irrigation (I): None (0), full irrigation (I).
2. Row spacing and seed rate (RS): Rows 17.8 cm (7 inches) apart, 224 kg seed (C), rows 35.6 cm (14 inches) apart, 56 kg seed (W).
Half plots: 3. Sowing date (SD): 6 Oct, 1971 (E), 17 Mar, 1972 (L).
Quarter plots: 4. Nitrogen: 45, 90 kg N as 'Nitro-Chalk'.
Kale: All combinations of:-
Whole plots: 1. Irrigation (I): None (0), full irrigation (I).
2. Row spacing and seed rate (RS): Rows 53.3 cm (21 inches) apart, 1.68 kg seed (C), rows 106.7 cm (42 inches) apart, 0.42 kg seed (W).
Half plots: 3. Sowing date (SD): 18 Apr, 1972 (E), 30 May, 1972 (L).
Quarter plots: 4. Fertiliser (F) (alternating with 1971 rates to potatoes): 753, 1130 kg (20:15:15).

Standard applications:
Winter wheat: 282 kg (0:20:20) combine drilled. Weedkiller: Autumn sown wheat (E): MCPA, mecoprop and dicamba ('Tetralex Plus' at 7 l in 220 l). Spring sown wheat (L): Ioxynil, bromoxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l).
Kale: Manures: None.

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Seed: Winter wheat: Maris Ranger.
Kale: Maris Kestrel, graded and dressed with gamma BHC and captan.

Cultivations, etc.:
Winter wheat: Ploughed: 23 Sept, 1971. Seed combine drilled (E): 6 Oct. N applied to L plots, seed combine drilled (L): 17 Mar, 1972. Weedkiller applied (E): 17 Apr. N applied to E plots: 20 Apr. Weedkiller applied (L): 8 May. Combine harvested (E): 5 Sept. Combine harvested (L): 7 Sept.
Kale: Deep-tine cultivated twice: 12 Nov and 10 Dec, 1971. NPK fertiliser applied (E): 6 Apr, 1972. Seed drilled (E): 18 Apr. NPK applied (L): 19 May. Seed drilled (L): 30 May. Cut: 21 Nov.

Standard errors per plot.
Wheat, grain, tonnes/hectare:
Whole plot: 0.389 or 7.0% (9 d.f.)
1/2 plot: 0.369 or 6.6% (12 d.f.)
1/4 plot: 0.628 or 11.3% (24 d.f.)
Kale, fresh weight: tonnes/hectare:
Whole plot: 5.62 or 7.0% (9 d.f.)
1/2 plot: 4.66 or 5.8% (12 d.f.)
1/4 plot: 5.95 or 7.5% (24 d.f.)

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72/R/RN/11

RAINFALL AND IRRIGATION: MM

Week-ending	Rainfall	IRRIGATION WHEAT (Winter and Spring)	IRRIGATION KALE (Early and Late)
May 6	11.0		
May 13	11.1		
May 20	6.3		
May 27	14.1		
June 3	4.5	25.0	
June 10	11.5		
June 17	5.2	15.0	
June 24	13.8		
July 1	3.2	25.0	
July 8	12.7		
July 15	0.0		
July 22	4.7	25.0	25.0
July 29	0.6	25.0	25.0
Aug 5	29.0		
Aug 12	18.1		
Aug 19	TR		
Aug 26	0.0		25.0
Sept 2	0.0		
Sept 9	16.2		
Sept 16	6.9		
Sept 23	8.1		
Sept 30	TR		
Total	177.0	115.0	75.0

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TABLES OF MEANS

WHEAT

GRAIN: TONNES/HECTARE

	RS		SD		N: KG/HA		
	C	W	E	L	45	90	Mean
I							
0	6.39	5.38	6.34	5.43	5.87	5.89	5.88
I	5.83	4.69	5.56	4.97	5.20	5.32	5.26
		RS					
		C	6.45	5.78	5.93	6.30	6.11
		W	5.44	4.62	5.15	4.91	5.03
				SD			
				E	5.92	5.97	5.95
				L	5.16	5.24	5.20
Mean					5.54	5.61	5.57

STANDARD ERRORS OF DIFFERENCES

I	RS	SD	N	I RS	I SD	RS SD	I N	RS N	SD N
0.194	0.194	0.130	0.157	0.275	0.234	0.234	0.250	0.250	0.204
Unless same levels of									
I					0.184		0.222		
RS						0.184		0.222	
SD									0.222

Mean D.M. %: 82.9

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WHEAT

STRAW: TONNES/HECTARE

	RS		SD		N: KG/HA		
	C	W	E	L	45	90	Mean
I							
O	5.83	4.99	6.04	4.78	5.24	5.58	5.41
I	5.92	5.71	6.36	5.27	5.58	6.05	5.81
		RS					
		C	6.67	5.73	5.73	6.03	5.88
		W	5.08	4.97	5.09	5.61	5.35
				SD			
				E	5.90	6.50	5.41
				L	4.92	5.13	5.82
Mean					6.20	5.02	5.61

Mean D.M. %: 74.0

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72/R/RN/11

KALE

FRESH WEIGHT: TONNES/HECTARE

	RS		SD		F: KG/HA		
	C	W	E	L	753	1130	Mean
I							
0	82.1	79.0	81.0	80.1	80.5	80.6	80.5
I	81.3	77.0	79.4	78.9	79.6	78.7	79.2
		RS					
		C	82.0	81.4	81.0	82.4	81.7
		W	78.4	77.5	79.1	76.9	78.0
				SD			
				E	80.7	79.7	80.2
				L	79.4	79.6	79.5
Mean					80.1	79.7	79.9

STANDARD ERRORS OF DIFFERENCES

I	RS	SD	F	I RS	I SD	RS SD	I F	RS F	SD F
2.81	2.81	1.65	1.49	3.97	3.26	3.26	3.18	3.18	2.22
Unless same levels of									
I					2.33		2.10		
RS						2.33		2.10	
SD									2.10

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72/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 eighth year, leys, rye 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) and 71/W/RN/12(t).

Whole plot dimensions: 8.53 x 30.5. Area harvested: Potatoes - 0.00087, rye - 0.00421, leys - 0.00524.

The first phase of this experiment, building up organic matter, ended in autumn 1971 and the second, testing, phase started in 1972. Blocks I and III were ploughed, including the leys, for a rotation of potatoes, winter wheat, sugar beet and barley. Blocks II and IV remained in rye and leys in 1972 preparatory to following the same rotation from 1973. Organic manures are no longer applied.

Balancing fertilisers applied in autumn 1971 for potatoes (kg)

Treatment(T)	P_2O_5	K_2O	MgO
DG	25	50	None
ST	None	None	None
PT	None	None	13
GM	None	38	None
FD	None	None	None
FS	None	None	None

The leys in 1972 (Blocks II and IV) and the leys ploughed up for potatoes (Blocks I and III) received the same fertiliser in autumn 1971.

LC	None	126	None
LN	50	376	25

Treatments:

Rates of nitrogen to potatoes 1972 on eighth plots:-

0, 50, 100, 150, 200, 250, 300, 350 kg N as 'Nitro-Chalk'.

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Basal applications:
Potatoes: 100 kg P205 as superphosphate, 200 kg K20 as muriate of potash in autumn, 100 kg P205 as superphosphate, 200 kg K20 as muriate of potash, 100 kg MgO as Epsom salts in spring. Weedkiller: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.
Rye: 60 kg P205, 120 kg K20 as (0:14:28), 40 kg MgO as Epsom salts, 40 kg N as 'Nitro-Chalk'.
Leys: Lc and Ln: 60 kg P205, 120 kg K20 as (0:14:28), 40 kg MgO as Epsom salts. Ln only: 126 kg N as 'Nitro-Chalk' in the spring and after each cut except the last.

Seed: Potatoes: Pentland Crown.
Rye: King II sown at 190 kg.

Cultivations, etc.:
Potatoes: Basal P and K applied: 26 Oct, 1971. Ploughed: 28 Oct. Balancing P, K and Mg applied: 14 Jan, 1972. Basal K applied: 7 Apr. Basal P applied: 8 Apr. Basal Mg and test N applied: 13 Apr. Rotary cultivated, potatoes planted: 19 Apr. Weedkiller applied: 11 May. Grubbed: 31 May. Rotary ridged: 19 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Sprayed with undiluted BOV at 200 l: 22 Sept. Lifted: 26 Sept.
Rye: PK applied: 11 Oct, 1971. Mg applied, ploughed: 12 Oct. Seed drilled: 23 Oct. N applied: 18 Apr, 1972. GM plots undersown with Essex Broad Red Clover at 30 kg: 26 Apr. Combine harvested: 29 Aug.
Leys: Basal PK and Mg applied: 25 Oct, 1971. Balancing P, K and Mg applied: 12 Jan, 1972. N applied to LN plots: 8 Mar, 26 June. Cut once: 15 June.

NOTE: Soil samples were taken after harvest for P, K and Mg analysis.

Standard errors per plot.

Potatoes, total tubers: tonnes/hectare:	Whole plot:	0.52 or 0.5% (7 d.f.)
	Sub plot:	1.05 or 1.1% (56 d.f.)
Rye, grain, tonnes/hectare:	Whole plot:	0.208 or 6.8% (5 d.f.)
	Sub plot:	0.202 or 6.6% (18 d.f.)

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72/W/RN/12

TABLES OF MEANS

LEY. 1ST AND ONLY CUT

DRY MATTER: TONNES/HECTARE

ROTATION

LC	LN
3.88	6.75

Mean D.M. %: 24.2

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72/W/RN/12

POTATOES

TOTAL TUBERS: TONNES/HECTARE

N: KG/HA

T	0	50	100	150	200	250	300	350	Mean
DG	27.6	31.2	35.0	34.5	41.2	45.2	40.4	47.5	37.8
ST	21.2	27.0	31.5	31.5	31.9	32.8	37.5	38.3	31.5
PT	18.6	30.7	29.5	37.6	40.3	45.2	44.8	47.1	36.7
GM	27.7	33.2	33.4	37.5	37.5	39.8	43.7	43.6	37.0
FD	20.3	24.7	25.0	28.1	32.1	32.9	35.5	41.7	30.0
FS	19.9	25.6	28.1	30.3	32.6	33.7	35.8	37.9	30.5
LC	29.4	30.3	37.7	34.9	36.6	35.7	39.9	45.8	36.3
LN	26.7	25.5	31.0	33.2	28.7	34.2	38.1	36.9	31.8
Mean	23.9	28.5	31.4	33.4	35.1	37.5	39.5	42.4	34.0

STANDARD ERRORS OF DIFFERENCES

T	N	T N
3.07	1.08	4.19
Unless same level of T		3.05

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72/W/RN/12

POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

N: KG/HA

T	0	50	100	150	200	250	300	350	Mean
DG	95.3	94.8	95.3	96.2	95.7	95.7	95.9	97.5	95.8
ST	95.6	94.8	93.5	96.2	95.1	95.3	95.7	96.3	95.3
PT	95.8	94.7	94.2	95.5	96.2	96.2	96.9	97.0	95.8
GM	96.0	95.7	95.2	93.1	95.8	96.7	95.9	96.8	95.6
FD	94.9	93.3	91.6	90.9	93.2	93.4	94.1	97.2	93.6
FS	94.3	92.8	95.3	95.0	96.0	95.4	96.6	96.6	95.2
LC	96.2	94.0	96.9	96.6	97.3	96.9	97.6	98.4	96.7
LN	96.7	92.7	96.0	96.4	96.3	96.9	95.8	96.9	96.0
Mean	95.6	94.1	94.7	95.0	95.7	95.8	96.1	97.1	95.5

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72/W/RN/12

RYE

GRAIN: TONNES/HECTARE

N: KG/HA

T	25	75	125	175	Mean
DG	3.73	3.63	3.84	3.71	3.73
ST	2.83	2.96	2.97	3.18	2.98
PT	2.74	2.54	2.51	2.83	2.66
GM	3.60	3.69	3.97	3.73	3.75
FD	2.45	2.84	2.58	2.54	2.60
FS	2.69	2.77	2.76	2.70	2.73
Mean	3.00	3.07	3.10	3.12	3.07

STANDARD ERRORS OF DIFFERENCES

T	N	T N
0.208	0.082	0.272

Unless same level of T 0.202

Mean D.M. %: 83.3

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72/W/RN/12

RYE

STRAW: TONNES/HECTARE

N: KG/HA

T	25	75	125	175	Mean
DG	5.46	5.59	5.40	4.95	5.35
ST	4.28	4.68	4.32	4.97	4.56
PT	4.07	3.84	3.64	4.12	3.92
GM	4.88	5.00	4.93	4.72	4.88
FD	3.41	4.10	3.19	4.24	3.73
FS	4.04	4.26	4.16	4.15	4.15
Mean	4.36	4.58	4.27	4.52	4.43

Mean D.M. %: 91.5

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72/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 seventh 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) and 71/W/RN/13(t).

Whole plot dimensions: 8.53 x 20.4. Sub plot area harvested: Potatoes - 0.00139, wheat - 0.00273, barley - 0.00273.

Basal applications: All crops: 130 kg P_2O_5, 260 kg K_2O as (0:14:28), half ploughed in, half applied to the plough furrow. Weedkiller to all crops except potatoes: Paraquat at 0.56 kg ion in 280 l.
Leys: 63 kg N in seedbed, 63 kg N after sowing as 'Nitro-Chalk'. Only one cut was taken.
Potatoes: 150 kg N as 'Nitro-Chalk'. Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.
Wheat: Weedkiller: 2,4-D at 0.7 kg with dichlorprop at 2.8 kg in 280 l.
Barley: Weedkiller: 2,4-D at 0.56 kg with dichlorprop at 2.2 kg in 280 l.

Seed: Leys: Italian ryegrass S22, sown at 28 kg.
Potatoes: Majestic.
Wheat: Cappelle, sown at 180 kg.
Barley: Julia (dressed with ethirimol) sown at 180 kg.

Cultivations, etc.: All plots: Half PK applied, ploughed: 1 Oct, 1971. Remaining PK applied: 7 Oct.
Leys: Paraquat applied: 9 Sept, 1971. Deep-tine cultivated, wheat block only: 4 Nov. N applied: 18 Apr, 1972. Rotary cultivated: 21 Apr. Seed sown: 26 Apr. N applied: 6 June. Cut once: 6 Sept.

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Potatoes: Deep-tine cultivated, wheat block only: 4 Nov, 1971. N applied: 4 Apr, 1972. Rotary cultivated, potatoes planted: 18 Apr. Linuron with paraquat applied: 6 May. Rotary ridged: 19 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Haulm mechanically destroyed: 14 Sept. Lifted: 20 Sept.

Wheat: Paraquat applied: 9 Sept, 1971. Seed drilled: 15 Oct. N applied: 11 Apr, 1972. 2,4-D with dichlorprop applied: 27 Apr. Combine harvested: 30 Aug.

Barley: Paraquat applied: 9 Sept, 1971. Seed drilled: 15 Mar, 1972. N applied: 16 Mar. 2,4-D with dichlorprop applied: 8 May. Combine harvested: 24 Aug.

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

Standard errors per sub plot.

Wheat, grain, tonnes/hectare:	0.389 or 16.7% (12 d.f.)
Barley, grain, tonnes/hectare:	0.197 or 4.0% (11 d.f.)

NOTES: (1) One barley plot (CS6, NS0) was severely damaged by birds. The yield of this plot was not recorded - an estimated value was used in the analysis.

(2) In 1972 and in 1971 the yields of leys were not recorded.

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72/W/RN/13

TABLES OF MEANS

POTATOES

N: KG/HA 1970

63	126	189	252	Mean
		PERMANENT WHEAT BLOCKS		
		TOTAL TUBERS: TONNES/HECTARE		
32.9	38.1	35.6	36.2	35.7
		PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE		
93.1	94.0	94.5	93.4	93.7
		PERMANENT BARLEY BLOCKS		
		TOTAL TUBERS: TONNES/HECTARE		
41.7	40.8	39.4	43.9	41.4
		PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE		
95.0	94.8	94.8	95.3	95.0

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72/W/RN/13

WINTER WHEAT

N: KG/HA

CROP SEQUENCE (CS)							63	126	189	252	Mean
	1966	1967	1968	1969	1970	1971					
							GRAIN: TONNES/HECTARE				
2	P	W	W	W	L	P	2.10	3.55	3.39	3.81	3.21
3	W	W	W	L	P	W	1.37	2.40	2.55	2.77	2.27
4	W	W	L	P	W	W	1.02	1.91	2.46	2.43	1.95
6	W	W	W	W	W	W	1.16	2.09	2.56	1.76	1.80
Mean							1.41	2.49	2.74	2.69	2.33

STANDARD ERRORS OF DIFFERENCES

N	CS* N
0.194	0.389

* Within the same level of CS only

	1966	1967	1968	1969	1970	1971					
							STRAW: TONNES/HECTARE				
2	P	W	W	W	L	P	2.05	4.21	4.40	5.03	3.92
3	W	W	W	L	P	W	1.65	3.36	3.34	3.54	2.97
4	W	W	L	P	W	W	1.78	2.79	3.02	2.85	2.61
6	W	W	W	W	W	W	3.02	3.61	3.56	3.61	3.45
Mean							2.13	3.49	3.58	3.76	3.24

Mean D.M. %: Grain: 82.6
Straw: 87.0

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72/W/RN/13

BARLEY

N: KG/HA

CROP SEQUENCE (CS)							50	100	150	200	Mean
	1966	1967	1968	1969	1970	1971					
							GRAIN: TONNES/HECTARE				
2	P	B	B	B	L	P	3.83	5.42	6.01	5.78	5.26
3	B	B	B	L	P	B	3.68	5.33	6.01	5.78	5.20
4	B	B	L	P	B	B	3.42	4.99	5.71	5.98	5.03
6	B	B	B	B	B	B	1.92	4.46	5.40	5.22	4.25
Mean							3.21	5.05	5.78	5.69	4.93

STANDARD ERRORS OF DIFFERENCES

N	CS* N
0.098	0.197

* Within the same level of CS only

	1966	1967	1968	1969	1970	1971					
							STRAW: TONNES/HECTARE				
2	P	B	B	B	L	P	3.05	4.63	5.41	5.28	4.59
3	B	B	B	L	P	B	2.80	3.82	4.64	5.10	4.09
4	B	B	L	P	B	B	2.78	3.77	4.71	5.21	4.12
6	B	B	B	B	B	B	2.43	3.70	5.00	5.15	4.07
Mean							2.76	3.98	4.94	5.19	4.22

Mean D.M. %: Grain: 85.6
Straw: 84.9

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72/W/RN/14

LONG TERM PHOSPHATE

Object: To study direct and residual effects of superphosphate on yields of three crops grown in rotation - Woburn Stackyard III.

Sponsor: G.E.G. Mattingly.

The fifth year, potatoes, sugar beet.

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

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

Whole plot dimensions: 8.53 x 15.8. Area harvested: Potatoes - 0.00451, sugar beet - 0.00130.

Treatments:
Sub plots: Superphosphate:
Potatoes: None (0), 188 kg P205 (P).
Sugar beet: None (0), 126 kg P205 (P).

Basal applications:
Potatoes: Manures: 2.5 tonnes ground chalk, 270 kg K20 as muriate of potash in autumn, 250 kg K20 as muriate of potash in spring, 250 kg N as 'Nitro-Chalk', 100 kg MgO as Epsom salts. Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.
Sugar beet: Manures: 2.5 tonnes of ground chalk, 370 kg K20 as muriate of potash in autumn, 190 kg N plus 120 kg K20 as (25:0:16), 100 kg MgO as Epsom salts, 6.8 kg B203 as 'Solubor' in 400 l. Weedkiller: Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.

Seed: Potatoes: Pentland Crown. Sugar beet: Klein E, sown at 6 kg.

Cultivations, etc.:
Potatoes: Ground chalk applied: 4 Oct, 1971. K applied: 11 Oct. Ploughed: 28 Oct. P applied: 7 Apr, 1972. Mg applied: 13 Apr. K and N applied: 17 Apr. Rotary cultivated, potatoes

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planted: 19 Apr. Weedkiller applied: 11 May. Rotary ridged: 19 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Sprayed with undiluted BOV at 200 l: 22 Sept. Haulm mechanically destroyed: 27 Sept. Lifted: 28 - 29 Sept.

Sugar beet: Ground chalk applied: 4 Oct, 1971. Deep-tine cultivated: 7 Oct. K applied: 11 Oct. Deep-tine cultivated: 3 Nov. Ploughed: 11 Nov. N, K and P applied: 22 Mar, 1972. Mg applied, power harrowed, seed drilled: 24 Mar. Weedkiller applied: 3 May. Singled: 23 - 26 May. Boron spray applied: 9 June. Insecticide applied: 29 June. Lifted: 6 - 9 Nov.

Standard errors per plot.

Potatoes: Total tubers, tonnes/hectare:
Whole plot: 1.71 or 4.6% (11 d.f.)
Sub plot: 2.35 or 6.3% (13 d.f.)

Sugar beet: Roots, (washed), tonnes/hectare:
Whole plot: 3.21 or 8.9% (11 d.f.)
Sub plot: 2.18 or 6.1% (13 d.f.)

Total sugar, tonnes/hectare:
Whole plot: 0.556 or 8.7% (11 d.f.)
Sub plot: 0.400 or 6.3% (13 d.f.)

Tops, tonnes/hectare:
Whole plot: 3.82 or 14.3% (11 d.f.)
Sub plot: 3.54 or 13.3% (13 d.f.)

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72/W/RN/14

TABLES OF MEANS

POTATOES

RESIDUAL P (R)

ANNUAL P (A)	0*	1	2	4	6	Mean
	TOTAL TUBERS: TONNES/HECTARE					
0	32.1	34.4	38.4	41.1	39.0	36.2
P	37.3	39.1	40.5	39.7	35.9	38.3
Mean	34.7	36.7	39.4	40.4	37.5	37.2

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
		0.78	
Between any of R1, 2, 4 or 6	1.40		1.95
R0 v any of R1, 2, 4 or 6	1.21		1.69
Unless same level of R			
R1, 2, 4 or 6			1.92
R0			1.36

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

ANNUAL P (A)						
0	98.4	98.6	98.9	98.2	97.5	98.3
P	97.6	97.8	96.8	96.2	97.0	97.2
Mean	98.0	98.2	97.8	97.2	97.3	97.8

* Duplicated treatment

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72/W/RN/14

SUGAR BEET

RESIDUAL P (R)

ANNUAL P (A)	0*	1	2	4	6	Mean
	ROOTS (WASHED): TONNES/HECTARE					
0	35.4	36.1	36.5	37.6	35.4	36.1
P	35.0	36.5	36.2	35.0	36.8	35.8
Mean	35.2	36.3	36.4	36.3	36.1	35.9

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
		0.73	
Between any of R1, 2, 4 or 6	2.62		2.91
R0 v any of R1, 2, 4 or 6	2.27		2.52
Unless same level of R			
R1, 2, 4 or 6			1.78
R0			1.26

SUGAR %

ANNUAL P (A)						
0	17.8	17.7	17.8	18.0	17.7	17.8
P	17.8	17.9	17.6	17.8	17.6	17.8
Mean	17.8	17.8	17.7	17.9	17.7	17.8

* Duplicated treatment

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72/W/RN/14

SUGAR BEET

RESIDUAL P (R)

ANNUAL P (A)	0*	1	2	4	6	Mean
	TOTAL SUGAR: TONNES/HECTARE					
0	6.30	6.39	6.49	6.76	6.27	6.42
P	6.23	6.54	6.39	6.22	6.47	6.35
Mean	6.27	6.47	6.44	6.49	6.37	6.38

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
		0.133	
Between any of R1, 2, 4 or 6	0.454		0.509
R0 v any of R1, 2, 4 or 6	0.393		0.441
Unless same level of R			
R1, 2, 4 or 6			0.327
R0			0.231

* Duplicated treatment

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72/W/RN/14

SUGAR BEET

RESIDUAL P (R)

ANNUAL P (A)	0*	1	2	4	6	Mean
	TOPS: TONNES/HECTARE					
0	25.2	26.3	25.8	27.2	26.3	26.0
P	26.9	27.2	27.9	28.6	26.5	27.3
Mean	26.0	26.7	26.9	27.9	26.4	26.7

STANDARD ERRORS OF DIFFERENCES

	R	A	R A
		1.18	
Between any of R1, 2, 4 or 6	3.12		3.73
R0 v any of R1, 2, 4 or 6	2.70		3.23
Unless same level of R			
R1, 2, 4 or 6			2.89
R0			2.05

* Duplicated treatment

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72/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 fourth year, potatoes, barley, sugar beet.

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

Whole plot dimensions: 5.33 x 31.1. Sub plot area harvested: Barley: 0.00052, potatoes: 0.00104, sugar beet: 0.00127.

Basal applications:
Barley: Manures: 300 kg (0:20:20). Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 280 l.
Potatoes: Manures: 1050 kg (0:14:28). Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.
Sugar beet: Manures: 2.5 tonnes magnesian limestone, 1050 kg (0:14:28), 6.7 kg B203, as 'Solubor', in 400 l. Weedkillers: Paraquat at 0.56 kg ion in 280 l. Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.

Seed: Barley: Julia (dressed with ethirimol) sown at 160 kg.
Potatoes: Pentland Crown.
Sugar beet: Klein E sown at 6 kg.

Cultivations, etc.:
Barley: Ploughed: 2 Nov, 1971. Dazomet applied, all plots rotary cultivated: 16 Nov. 'D-D' injected: 17 Nov. Ploughed: 14 Feb, 1972. N applied: 14 Mar. Seed combine drilled: 15 Mar. Weedkiller applied: 3 May. Combine harvested: 17 Aug.
Potatoes: Ploughed: 2 Nov, 1971. Dazomet applied, all plots rotary cultivated: 16 Nov. 'D-D' injected: 17 Nov. Ploughed: 14 Feb, 1972. PK applied: 22 Mar. N applied: 23 Mar. Rotary cultivated, potatoes planted: 5 Apr. Weedkiller applied: 5 May. Rotary ridged: 3 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 6 Sept. Lifted: 15 Sept.

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Sugar beet: Paraquat applied: 10 Sept, 1971. Magnesian limestone applied: 5 Oct. Ploughed: 2 Nov. Dazomet applied, all plots rotary cultivated: 16 Nov. 'D-D' injected: 17 Nov. Ploughed: 14 Feb, 1972. PK applied: 22 Mar. N applied, power harrowed: 23 Mar. Seed drilled: 24 Mar. Phenmedipham applied: 3 May. Singled: 22 May. Boron spray applied: 9 June. Insecticide applied: 29 June. Lifted: 6 - 7 Nov.

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

Standard errors per sub plot.

Barley, grain, tonnes/hectare:	0.598 or 16.8% (21 d.f.)
Potatoes, total tubers, tonnes/hectare:	2.84 or 8.1% (21 d.f.)
Sugar beet, roots, tonnes/hectare:	4.22 or 11.2% (21 d.f.)
total sugar, tonnes/hectare:	0.775 or 11.7% (21 d.f.)

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72/W/RN/15

TABLES OF MEANS

BARLEY

FUMIGANT

	O&R	P	S	B	A	AZ	Mean
N: KG/HA	GRAIN: TONNES/HECTARE						
38	2.75	1.98	3.30	1.97	3.72	4.10	2.94
75	3.88	4.56	4.98	4.02	3.45	3.36	4.02
113	2.74	3.46	4.41	4.06	4.04	4.86	3.76
Mean	3.12	3.33	4.23	3.35	3.73	4.10	3.57

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
Between any of P, S, B, A or AZ	0.346	0.598
O&R v any of P, S, B, A or AZ	0.299	0.519

* Within the same level of N only

N: KG/HA	STRAW: TONNES/HECTARE						
38	2.23	2.17	3.10	2.00	2.64	3.47	2.55
75	3.80	4.63	4.24	3.17	3.26	4.79	3.96
113	4.16	4.42	4.94	3.89	3.77	5.53	4.41
Mean	3.40	3.74	4.09	3.02	3.22	4.60	3.64

Mean D.M. %: Grain: 76.1
Straw: 46.9

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72/W/RN/15

POTATOES

•

FUMIGANT

	O&R	P	S	B	A	AZ	Mean
N: KG/HA	TOTAL TUBERS: TONNES/HECTARE						
75	26.7	30.8	29.2	31.3	29.3	36.4	30.0
150	32.2	37.7	39.5	37.0	39.2	37.7	36.5
225	38.4	37.2	39.2	38.1	43.0	34.2	38.3
Mean	32.5	35.2	35.9	35.5	37.2	36.1	35.0

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
Between any of P, S, B, A or AZ	1.64	2.84
O&R v any of P, S, B, A or AZ	1.42	2.46

* Within the same level of N only

N: KG/HA	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE						
75	87.1	91.5	87.5	91.0	89.3	91.7	89.3
150	92.1	93.6	93.2	92.1	92.4	94.0	92.8
225	92.6	94.2	94.7	94.1	92.2	92.1	93.2
Mean	90.6	93.1	91.8	92.4	91.3	92.6	91.8

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72/W/RN/15

SUGAR BEET

FUMIGANT

N: KG/HA	O&R	P	S	B	A	AZ	Mean
	ROOTS (WASHED): TONNES/HECTARE						
75	31.9	35.7	33.0	41.6	28.5	38.1	34.4
150	37.1	43.9	38.8	41.1	36.4	38.8	39.0
225	39.2	42.6	36.4	40.3	37.8	41.4	39.5
Mean	36.1	40.7	36.0	41.0	34.2	39.4	37.7

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
Between any of P, S, B, A or AZ	2.44	4.22
O&R v any of P, S, B, A or AZ	2.11	3.66

* Within the same level of N only

N: KG/HA	SUGAR %						
75	18.3	18.1	17.5	18.1	17.2	18.2	18.0
150	17.9	17.6	17.8	17.0	17.5	17.8	17.6
225	17.0	17.4	16.9	17.4	16.8	17.2	17.1
Mean	17.7	17.7	17.4	17.5	17.2	17.7	17.6

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72/W/RN/15

SUGAR BEET

FUMIGANT

	O&R	P	S	B	A	AZ	Mean
N: KG/HA	TOTAL SUGAR: TONNES/HECTARE						
75	5.86	6.47	5.78	7.52	4.89	6.94	6.19
150	6.63	7.74	6.89	6.98	6.36	6.90	6.88
225	6.67	7.43	6.16	7.00	6.37	7.12	6.77
Mean	6.38	7.21	6.28	7.17	5.87	6.99	6.61

STANDARD ERRORS OF DIFFERENCES

	FUMIGANT	N* FUMIGANT
Between any of P, S, B, A or AZ	0.447	0.775
O&R v any of P, S, B, A or AZ	0.387	0.671

* Within the same level of N only

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72/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 P and K applied to potatoes in 1971, on yields of winter wheat - Harwoods Piece.

Sponsor: F.V. Widdowson.

The fifteenth year, winter wheat.

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) and 71/R/CS/1(t).

Whole plot dimensions: 2.13 x 16.5. Sub plot area harvested: 0.00098.

Treatments: No fresh treatments were tested in 1972, only residual effects.

Basal applications: 100 kg N as 'Nitro-Chalk' in spring. Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7 l in 220 l).

Seed: Cappelle, sown at 190 kg.

Cultivations, etc.: Deep-tine cultivated twice: 30 Sept, 1971.
Seed drilled: 5 Oct. Weedkiller applied: 17 Apr, 1972.
N applied: 18 Apr. Combine harvested: 31 Aug.

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.309 or 4.4% (33 d.f.)
Sub plot: 0.360 or 5.1% (36 d.f.)

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72/R/CS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

K2O: KG/HA
1969 - 71

	0	125	Mean
Treatment 1958 - 67 (T) NPK			
010	6.73	7.30	7.01
110	6.92	6.85	6.88
111	6.82	7.53	7.17
112	7.32	7.52	7.42
210	6.07	7.03	6.55
211	6.80	7.22	7.01
212	7.05	7.11	7.08
310	6.66	7.20	6.93
311	7.01	7.29	7.15
312	7.02	7.40	7.21
302	7.58	7.42	7.50
322	7.07	7.23	7.15
Mean	6.92	7.26	7.09

STANDARD ERRORS OF DIFFERENCES

	T	K2O	T K2O
	0.219	0.074	0.283
Unless same level of T			0.255

Mean D.M. %: 85.0

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72/R/CS/2

GRAZED REFERENCE PLOTS

Object: To study the residual effects of N, P and K fertilisers, applied to grazed grass 1959 - 1970, on the yield of grass from which livestock are now excluded - Highfield IX.

Sponsor: F.V. Widdowson.

The fourteenth 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 and 71/R/CS/2(t).

Whole plot dimensions: 4.57 x 7.32. Area harvested: 0.00058.

Cultivations, etc.: First basal N applied: 1 Mar, 1972. Cut three times: 22 May, 19 July, 25 Oct. Basal N applied after each of the first two cuts.

NOTE: The percentages of P and K in the dry grass were measured for each cut.

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

1st cut:	0.597	or 13.5% (39 d.f.)
2nd cut:	0.254	or 6.8% (39 d.f.)
3rd cut:	0.316	or 18.9% (39 d.f.)
Total of 3 cuts:	0.711	or 7.3% (39 d.f.)

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72/R/CS/2

TABLES OF MEANS

GRASS: DRY MATTER: TONNES/HECTARE

Treatment 1959-70 (T)	1st cut	2nd cut	3rd cut	Total of 3 cuts
PK				
N0 00	2.81	4.12	1.53	8.46
N1 00	2.53	3.67	1.62	7.82
A1 00	2.89	3.49	1.56	7.94
N0 10	3.90	3.36	1.79	9.05
N1 10	3.48	2.95	1.39	7.81
A1 10	3.51	2.78	1.49	7.78
N0 01	3.45	4.70	1.72	9.87
N1 01	4.21	3.98	1.84	10.03
A1 01	4.26	4.08	1.63	9.97
N0 11	6.50	3.88	1.92	12.30
N1 11	5.88	3.90	2.00	11.77
A1 11	6.69	3.58	1.65	11.92
N2 11	5.84	3.88	1.74	11.46
A2 11	5.79	3.53	1.57	10.88
Mean	4.41	3.71	1.67	9.79
STANDARD ERROR OF DIFFERENCES				
T	0.422	0.179	0.223	0.503
Mean D.M. %:	17.7	23.3	28.3	23.1

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72/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, formerly** Ophiobolus graminis) in wheat - Little Knott I.

Sponsors: D.B. Slope, E.W. Broom.

The twelfth year winter wheat.

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) and 71/R/CS/6(t).

Whole plot dimensions: 4.27 x 20.1. Sub plot area harvested: 0.00269.

On one block the plots of Crop Sequences 2 (N3,N5) and 3 (N7,N9) were fallowed **to prepare land for new cropping sequences in 1973.** Estimated values were used in the analysis.

Basal applications: 250 kg (0:14:28) combine drilled. 610 kg 'Nitro-Chalk' in spring. Weedkillers: Paraquat at 0.56 kg ion in 220 l, terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l), MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Seed: Joss Cambier sown at 180 kg.

Cultivations, etc.: Paraquat applied: 10 Sept, 1971. Ploughed: 27 Sept. Seed combine drilled: 15 Oct. 'Prebane' applied: 25 Oct. Fallow plots sprayed with paraquat at 1.12 kg ion by knapsack sprayer: 15 Dec. 'Nitro-Chalk' applied: 19 Apr, 1972. 'Banlene Plus' applied: 27 Apr. Fallow plots rotary cultivated on two occasions: 6 May, 13 July. Combine harvested: 29 Aug.

NOTE: Estimates of take-all (**Gaeumannomyces graminis, formerly** Ophiobolus graminis) were made in spring and summer.

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.477 or 9.9% (35 d.f.)
Sub plot: 0.258 or 5.3% (36 d.f.)

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72/R/CS/6

TABLES OF MEANS

GRAIN: TONNES/HECTARE

Crop sequence(CS)

Crop in	1	2	3	4	5	6	7	8	9	10	
1961	O	WS	O	BE	WS	WS	B	WS	WS	BE	
62	BE	O	WS	O	BE	WS	B	WS	WW	WW	
63	B	BE	O	WS	O	BE	B	WS	WW	P	
64	B	B	BE	O	WS	O	B	WS	WW	B	
65	B	B	B	BE	O	WS	B	WS	WW	BE	
66	B	B	B	B	BE	O	B	WS	WW	WW	
67	B	B	B	B	B	BE	B	WS	WW	P	
68	B	B	B	B	B	B	B	WS	F	B	
69	WW	WW	WW	WW	WW	WW	WW	WW	WW	F	
70	F	WW	WW	WW	WW	WW	WW	WW	WW	WW	
71	WW	WW	WW	WW	WW	WW	WW	WW	WW	WW	Mean
RESIDUAL											
N3	5.15	5.08	4.76	4.58	5.06	4.69	4.52	4.76	4.46	4.72	4.78
N5	5.05	5.09	5.02	5.00	5.32	4.76	5.25	5.03	4.58	4.18	4.93
N7	4.95	5.34	5.22	5.17	4.47	4.24	5.18	4.25	4.93	4.53	4.83
N9	5.03	5.20	5.02	5.07	4.87	4.82	4.36	5.04	4.21	4.35	4.80
LIME											
U	4.95	5.13	4.86	4.74	4.79	4.42	4.60	4.55	4.29	4.46	4.68
L	5.14	5.22	5.15	5.17	5.07	4.83	5.06	4.98	4.80	4.43	4.99
Mean	5.05	5.18	5.00	4.95	4.93	4.63	4.83	4.77	4.54	4.45	4.83

	RESIDUAL			
	N3	N5	N7	N9
U	4.53	4.81	4.70	4.67
L	5.02	5.04	4.96	4.92

STANDARD ERRORS OF DIFFERENCES

N	CS	N CS	N* LIME	CS* LIME
0.151	0.238	0.477	0.161	0.255

* Within the same level of LIME only

Mean D.M. %: 85.9

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72/R/CS/10 and 72/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 eleventh year - barley.

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

Whole plot dimensions: 6.40 x 18.3. Area harvested: Sawyers I (R): 0.00512. Stackyard C (W): 0.00516.

Basal applications:
Sawyers I (R): 90 kg N as 'Nitro-Chalk' combine drilled.
Weedkillers: Paraquat at 0.56 kg ion in 220 l. Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).
Stackyard C (W): 130 kg N as 'Nitro-Chalk' broadcast before sowing. Weedkiller: Paraquat at 0.56 kg ion in 280 l.

Seed: Sawyers I (R): Julia (dressed with ethirimol) sown at 160 kg.
Stackyard C (W): Julia (dressed with ethirimol) sown at 150 kg.

Cultivations, etc.:-
Sawyers I (R): Paraquat applied: 9 Sept, 1971. Ploughed: 11 Nov. P and K applied, seed combine drilled: 20 Mar, 1972. 'Tetroxone' applied: 17 May. CAD plots cut and carted, because the crop had failed and plots were very weedy. CAD plots rotary cultivated twice: 3 July, 11 July. Combine harvested: 24 Aug.
Stackyard C (W): Paraquat applied: 9 Sept, 1971. Ploughed: 27 Oct. N, P and K applied: 14 Mar, 1972. Seed drilled: 15 Mar. CAD plots cut and carted, because the crop had failed and plots were very weedy: 3 July. CAD plots rotary cultivated three times: 4 July, 18 July, 31 July. Combine harvested: 15 Aug.

Standard errors per plot. Grain, tonnes/hectare:
Sawyers I (R): 1.130 or 25.8% (11 d.f.)
Stackyard C (W): 0.371 or 7.0% (11 d.f.)

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72/R/CS/10 and 72/W/CS/10

TABLES OF MEANS

SAWYERS I (R)

GRAIN: TONNES/HECTARE

	CA 2	CA 4	CA 8	Mean
Mean	3.67	4.55	4.90	4.37
P				
0	2.72	3.92	4.23	3.62
1	4.63	5.19	5.56	5.12
K				
0	3.38	4.14	4.26	3.93
1	3.96	4.97	5.54	4.82

	P 0	P 1
K		
0	3.34	4.51
1	3.90	5.74

	CA 2		CA 4		CA 8	
K	0	1	0	1	0	1
P						
0	3.09	2.35	3.51	4.33	3.43	5.03
1	3.68	5.57	4.77	5.61	5.08	6.05

STANDARD ERRORS OF DIFFERENCES

CA	P	K	CA P	CA K	P K	CA P K
0.565	0.461	0.461	0.799	0.799	0.653	1.130

Mean D.M. %: 80.7

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72/R/CS/10 and 72/W/CS/10

SAWYERS I (R)

STRAW: TONNES/HECTARE

	CA 2	CA 4	CA 8	Mean
Mean	3.28	4.32	4.75	4.12
P				
0	2.36	3.93	4.20	3.50
1	4.19	4.71	5.30	4.73
K				
0	2.83	3.89	4.19	3.64
1	3.73	4.74	5.31	4.59

	P 0	P 1
K		
0	3.18	4.10
1	3.82	5.37

	CA 2		CA 4		CA 8	
K	0	1	0	1	0	1
P						
0	2.51	2.22	3.55	4.31	3.47	4.93
1	3.15	5.24	4.24	5.17	4.91	5.69

Mean D.M. %: 86.8

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72/R/CS/10 and 72/W/CS/10

STACKYARD C (W)

GRAIN: TONNES/HECTARE

	CA 2	4	8	Mean
Mean	4.81	5.28	5.83	5.31
P				
0	4.53	4.97	5.75	5.09
1	5.09	5.59	5.91	5.53
K				
0	4.25	5.19	5.43	4.96
1	5.37	5.37	6.23	5.66

	P 0	1
K		
0	4.89	5.03
1	5.28	6.03

	CA 2		4		8	
K	0	1	0	1	0	1
P						
0	4.32	4.74	4.96	4.98	5.38	6.12
1	4.18	5.99	5.42	5.76	5.47	6.35

STANDARD ERRORS OF DIFFERENCES

CA	P	K	CA P	CA K	P K	CA P K
0.186	0.152	0.152	0.263	0.263	0.214	0.371

Mean D.M. %: 81.9

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72/R/CS/10 and 72/W/CS/10

STACKYARD C (W)

STRAW: TONNES/HECTARE

	CA 2	4	8	Mean
Mean	3.52	3.84	4.25	3.87
P				
0	3.00	3.53	4.20	3.57
1	4.04	4.14	4.31	4.17
K				
0	3.01	3.55	3.99	3.51
1	4.03	4.13	4.52	4.22

	P 0	1
K		
0	3.31	3.72
1	3.84	4.61

	CA 2		4		8	
K	0	1	0	1	0	1
P						
0	2.70	3.29	3.32	3.74	3.90	4.49
1	3.32	4.76	3.77	4.51	4.08	4.55

Mean D.M. %: 88.6

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72/W/CS/11

SOIL STRUCTURE

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

Sponsor: A.E. Johnston.

The tenth year, barley.

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) and 71/W/CS/11.

Design: 4 randomised blocks of 5 plots, each block containing all levels of peat.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. Peat (tonnes dry matter/hectare)

Applied 1963-68	1972	Total	
None	None	None	(0)
7.8	None	7.8	(1)
47.0	7.8	54.8	(2)
94.0	16.0	110.0	(3)
141.0	24.0	165.0	(4)

2. Nitrogen: None, 50, 100, 150 kg N as 'Nitro-Chalk'.

Basal applications: 2.5 tonnes ground chalk, 84 kg P as triple superphosphate, 280 kg K as potassium bicarbonate, 56 kg Mg as magnesium sulphate. Weedkiller: Dichlorprop and MCPA ('Mephetol Plus' at 5.6 l in 340 l).

Seed: Julia, dressed with ethirimol, sown at 170 kg.

Cultivations, etc.: Ground chalk, P, K, Mg and peat applied, plots dug by hand: 7 Dec, 1971. Seed drilled, N applied: 14 Mar, 1972. Weedkiller applied: 17 May.

NOTE: Birds caused severe damage to the crop and yields were not taken.

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72/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. Nitrogen fixed by legumes is estimated and the effects of treatments on nutrients available in the soil is also studied - Park Grass old plot 6.

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

The eighth 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) and 71/R/CS/13.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 1.83 x 10.1. Area harvested: 0.00086.

Treatments:
Herbicide: Sprayed with mecoprop ('Clovotox' at 11.2 l in 450 l) to control legumes (two plots per block) (OS) - nitrogen fertiliser is not applied to this treatment.
Nitrogen (total applied per year in 4 equal dressings): None (two plots per block) (0), 75 (1), 150 (2), 225 (3), 300 (4), 375 (5), 450 (6) kg N as 'Nitro-Chalk'.
Rates 1 and 2 were previously 1 (145 kg N).
Rates 3 and 4 were previously 2 (290 kg N).
Rates 5 and 6 were previously 3 (435 kg N).

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: 6 Dec, 1971. N applied: 24 Mar, 1972. Herbicide applied to S plots: 27 Apr, 24 July. Plots cut: 15 May, 29 June, 14 Aug, 23 Oct. N applied after each cut except the last.

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

1st cut:	0.300	or 10.3% (29 d.f.)
2nd cut:	0.232	or 11.9% (29 d.f.)
3rd cut:	0.137	or 10.6% (29 d.f.)
4th cut:	0.120	or 21.5% (29 d.f.)
Total of 4 cuts:	0.465	or 6.9% (29 d.f.)

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72/R/CS/13

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

N

OS*	0*	1	2	3	4	5	6	Mean
				1ST CUT				
0.60	1.66	2.17	2.80	4.38	4.77	5.00	5.40	2.90

STANDARD ERRORS OF DIFFERENCES

Between any of N1-N6	0.212
Between NOS and NO	0.150
Between NOS or NO and any of N1-N6	0.184

				2ND CUT				
0.74	1.77	1.85	2.27	2.37	2.98	2.41	2.59	1.95

STANDARD ERRORS OF DIFFERENCES

Between any of N1-N6	0.164
Between NOS and NO	0.116
Between NOS or NO and any of N1-N6	0.142

* Duplicated treatment

Mean D.M.%: 1st cut: 21.4
2nd cut: 24.4

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72/R/CS/13

DRY MATTER: TONNES/HECTARE

N

OS*	0*	1	2	3	4	5	6	Mean
				3RD CUT				
0.23	1.16	0.94	1.27	1.78	1.91	2.11	2.21	1.30

STANDARD ERRORS OF DIFFERENCES

Between any of N1-N6	0.097
Between NOS and NO	0.069
Between NOS or NO and any of N1-N6	0.084

				4TH CUT				
0.15	0.23	0.38	0.71	0.84	1.01	0.91	0.99	0.56

STANDARD ERRORS OF DIFFERENCES

Between any of N1-N6	0.085
Between NOS and NO	0.060
Between NOS or NO and any of N1-N6	0.074

* Duplicated treatment

Mean D.M.%: 3rd cut: 25.4
4th cut: 34.5

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72/R/CS/13

DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

N

OS*	0*	1	2	3	4	5	6	Mean
1.72	4.82	5.34	7.05	9.36	10.68	10.42	11.19	6.71

STANDARD ERRORS OF DIFFERENCES

Between any of N1-N6	0.329
Between NOS and NO	0.233
Between NOS or NO and any of N1-N6	0.285

* Duplicated treatment

Mean D.M.%: Total of 4 cuts: 26.4

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72/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 eighth year, old grass.

For previous years see 65/C/22(t), 66/C/13(t), 67/C/9(t), 68/C/7 and 69-71/R/CS/14.

Whole plot dimensions: 1.83 x 10.1. Area harvested: 0.00086.

Cultivations, etc.: P and K applied: 6 Dec, 1971. N applied: 10 Mar, 1972. Cut three times: 30 May, 26 July, 23 Oct. N applied after first two cuts.

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

Plot 5/1:	1st cut:	0.196 or 7.1% (11 d.f.)
	2nd cut:	0.292 or 15.6% (11 d.f.)
	3rd cut:	0.193 or 35.7% (11 d.f.)
	Total of 3 cuts:	0.434 or 8.4% (11 d.f.)
Plot 5/2:	1st cut:	0.577 or 15.6% (11 d.f.)
	2nd cut:	0.228 or 9.9% (11 d.f.)
	3rd cut:	0.206 or 16.4% (11 d.f.)
	Total of 3 cuts:	0.567 or 7.8% (11 d.f.)

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72/R/CS/14

TABLES OF MEANS

PLOT 5/1: DRY MATTER, TONNES/HECTARE

1ST CUT

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	1.96	3.32	3.36	3.38	3.01
K					
0	1.83	1.97	2.10	2.18	2.02
2	2.48	3.80	4.08	3.27	3.41
4	1.75	4.01	3.60	4.29	3.41
8	1.77	3.51	3.68	3.77	3.18
N					
1	1.97	2.86	2.74	2.96	2.63
2	1.95	3.79	3.98	3.80	3.38

	K 0	2	4	8
N				
1	2.09	3.02	2.63	2.79
2	1.94	3.80	4.19	3.58

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.098	0.098	0.069	0.196	0.139	0.139

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

1ST CUT

K1 and K6 plots

	K 1*	6*	Mean
N			
1	1.90	1.50	1.70
2	2.03	2.11	2.07
Mean	1.97	1.81	1.89

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.139	0.139	0.196

Grand mean: 2.78
Mean D.M. %: 23.4

* Applied 1965

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

2ND CUT

Excluding K1 and K6 plots

P

	0	1	2	4	Mean
Mean	1.98	1.99	1.96	1.87	1.95
K					
0	1.47	1.65	1.47	1.26	1.46
2	2.04	1.88	1.83	1.79	1.89
4	2.28	2.03	2.18	2.20	2.17
8	2.12	2.41	2.38	2.25	2.29
N					
1	1.79	1.87	1.77	1.74	1.79
2	2.16	2.11	2.16	2.01	2.11

K

	0	2	4	8
N				
1	1.48	1.59	2.03	2.07
2	1.44	2.18	2.31	2.50

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.146	0.146	0.103	0.292	0.206	0.206

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

2ND CUT

K1 and K6 plots

N	K 1*	K 6*	Mean
1	1.28	1.38	1.33
2	1.92	1.67	1.79
Mean	1.60	1.53	1.56

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.206	0.206	0.292

Grand mean: 1.87
Mean D.M. %: 25.5

* Applied 1965

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

3RD CUT

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	0.23	0.64	0.72	0.84	0.61
K					
0	0.26	0.36	0.48	0.60	0.42
2	0.34	0.67	1.03	0.62	0.67
4	0.11	0.95	0.69	1.00	0.69
8	0.21	0.59	0.68	0.16	0.66
N					
1	0.20	0.47	0.54	0.70	0.48
2	0.26	0.81	0.90	0.99	0.74

	K 0	2	4	8
N				
1	0.37	0.54	0.44	0.56
2	0.48	0.79	0.93	0.76

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.097	0.097	0.068	0.193	0.137	0.137

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

3RD CUT

K1 and K6 plots

N	K 1*	6*	Mean
1	0.23	0.25	0.24
2	0.29	0.31	0.30
Mean	0.26	0.28	0.27

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.137	0.137	0.193

Grand mean: 0.54
Mean D.M. %: 35.3

* Applied 1965

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	4.17	5.95	6.05	6.10	5.57
K					
0	3.56	3.97	4.04	4.04	3.90
2	4.86	6.35	6.94	5.68	5.96
4	4.15	6.99	6.46	7.48	6.27
8	4.10	6.51	6.74	7.18	6.13
N					
1	3.96	5.20	5.06	5.40	4.90
2	4.37	6.71	7.04	6.80	6.23

	K 0	2	4	8
N				
1	3.94	5.15	5.11	5.42
2	3.87	6.76	7.43	6.84

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.217	0.217	0.154	0.434	0.307	0.307

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72/R/CS/14

PLOT 5/1: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

K1 and K6 plots

	K 1*	6*	Mean
N			
1	3.42	3.14	3.28
2	4.23	4.09	4.16
Mean	3.82	3.62	3.72

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.307	0.307	0.434

Grand mean: 5.20
Mean D.M. %: 28.1

* Applied 1965

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

1ST CUT

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	3.67	4.02	3.59	3.43	3.68
K					
0	3.55	4.01	2.94	3.27	3.44
2	3.77	4.36	4.11	3.23	3.87
4	4.13	3.87	3.95	3.80	3.94
8	3.23	3.83	3.33	3.43	3.46
N					
1	2.69	2.41	2.81	2.36	2.57
2	4.65	5.63	4.37	4.51	4.79

	K 0	2	4	8
N				
1	2.42	2.84	2.72	2.28
2	4.47	4.89	5.16	4.63

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.289	0.289	0.197	0.577	0.408	0.408

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

1ST CUT

K1 and K6 plots

	K		
	1*	6*	Mean
N			
1	3.20	3.22	3.21
2	4.24	4.53	4.39
Mean	3.72	3.88	3.80

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.408	0.408	0.577

Grand mean: 3.70
Mean D.M. %: 23.1

* Applied 1965

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

2ND CUT

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	2.28	2.28	2.30	2.24	2.28
K					
0	2.15	2.25	2.28	2.18	2.22
2	2.21	2.34	2.47	2.20	2.30
4	2.18	2.31	2.18	2.17	2.21
8	2.59	2.22	2.26	2.42	2.37
N					
1	2.13	2.01	2.09	1.84	2.02
2	2.43	2.55	2.50	2.65	2.53

	K 0	2	4	8
N				
1	1.81	2.20	1.93	2.13
2	2.62	2.40	2.49	2.61

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.114	0.114	0.081	0.228	0.161	0.161

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

2ND CUT

K1 and K6 plots

K

	1*	6*	Mean
N			
1	2.10	2.08	2.09
2	2.57	2.81	2.69
Mean	2.34	2.45	2.39

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.161	0.161	0.228

Grand mean: 2.30
Mean D.M. %: 27.0

* Applied 1965

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

3RD CUT

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	1.31	1.19	1.26	1.29	1.26
K					
0	1.30	1.04	1.28	1.33	1.24
2	1.36	1.28	1.28	1.30	1.30
4	1.21	1.26	1.17	1.47	1.28
8	1.36	1.18	1.30	1.07	1.23
N					
1	0.89	0.80	0.93	0.77	0.85
2	1.72	1.57	1.58	1.81	1.67

	K 0	2	4	8
N				
1	0.83	0.92	0.84	0.80
2	1.64	1.69	1.71	1.65

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.103	0.103	0.073	0.206	0.146	0.146

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

3RD CUT

K1 and K6 plots

	K 1*	6*	Mean
N			
1	1.01	1.00	1.00
2	1.59	1.46	1.53
Mean	1.30	1.23	1.26

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.146	0.146	0.206

Grand mean: 1.26
Mean D.M. %: 30.9

* Applied 1965

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

Excluding K1 and K6 plots

	P 0	1	2	4	Mean
Mean	7.26	7.48	7.14	6.97	7.21
K					
0	7.00	7.29	6.51	6.78	6.90
2	7.34	7.98	7.86	6.73	7.47
4	7.53	7.44	7.30	7.44	7.43
8	7.18	7.23	6.89	6.92	7.06
N					
1	5.71	5.21	5.83	4.97	5.43
2	8.81	9.75	8.45	8.96	8.99

	K 0	2	4	8
N				
1	5.06	5.96	5.50	5.21
2	8.73	8.98	9.36	8.90

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.283	0.283	0.200	0.567	0.401	0.401

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72/R/CS/14

PLOT 5/2: DRY MATTER, TONNES/HECTARE

TOTAL OF 3 CUTS

K1 and K6 plots

K

	1*	6*	Mean
N			
1	6.31	6.30	6.31
2	8.40	8.81	8.61
Mean	7.35	7.56	7.46

STANDARD ERRORS OF DIFFERENCES

N	K	N K
0.401	0.401	0.567

Grand mean: 7.26
Mean D.M. %: 27.0

* Applied 1965

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72/W/CS/16

IRRIGATION AND EELWORMS

Object: To study the cumulative and residual effects of dazomet and the effects of irrigation on the yield and incidence of Heterodera rostochiensis on potatoes grown continuously. Susceptible and resistant varieties are studied, either grown continuously or alternated - Woburn Butt Close Series I and IV.

Sponsors: F.G.W. Jones, K. Evans, D.L. Trudgill.

The seventh year, potatoes.

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

Treatments: Series I: All combinations of:-

1. Whole plots: Irrigation: None (O), full irrigation 1966-72 (C).
2. Quarter plots: Residues of fumigants applied 1966-71: None (O), DD (1966-68), dazomet (1969-71) (F).
3. Strips of 4 plots; residues of sequences of varieties in successive years (PD = Pentland Dell, MP = Maris Piper): continuous PD, continuous MP, alternating PD/MP, alternating MP/PD.

NOTE: The sequences of varieties ended in 1971 on Series I. Pentland Crown was planted on all plots of this series in 1972. The treatments on Series IV continued as in 1971.

Irrigation to C plots 1972 (mm water) (Series I and IV):

8-9 June	12.7
16 June	12.7
22-23 June	12.7
28-29 June	12.7
11-12 July	12.7
18-19 July	12.7
21-24 July	12.7
Total	88.9

Basal applications: 1510 kg (13:13:20). Weedkiller: Series I: Linuron at 1.1 kg with paraquat 0.42 kg ion in 370 l. Series IV: Linuron at 1.1 kg in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

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Cultivations, etc.:-

Series I: Deep-tine cultivated: 13 Sept, 1971. Ploughed: 17 Dec. NPK applied: 29 Mar, 1972. Rotary cultivated, potatoes planted: 6 Apr. Weedkiller applied: 5 May. Rotary ridged: 3 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Haulm mechanically destroyed: 6 Sept. Lifted: 15 Sept.

Series IV: Deep-tine cultivated: 11 Sept, 1971. Dazomet applied, all plots rotary cultivated: 15 Dec. Ploughed: 15 Feb, 1972. NPK applied: 29 Mar. Rotary cultivated: 19 Apr. Potatoes planted: 20 Apr. Weedkiller applied: 8 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 6 Sept. Lifted: 15 Sept.

NOTES: (1) Soil samples were taken before planting and after lifting for egg and cyst counts of Heterodera rostochiensis 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 only.

(3) Plant samples were taken at three weekly intervals to measure leaf areas, fresh and dry weights of haulm, fresh weights of roots and new tubers and to determine percentage K in the haulm.

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

Series I:	Pooled whole and half plot:	4.74 or 18.8% (14 d.f.)
	Quarter plot:	3.09 or 12.2% (16 d.f.)
Series IV:	Pooled whole and half plot:	3.08 or 9.5% (14 d.f.)
	Quarter plot:	5.07 or 15.7% (16 d.f.)

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72/W/CS/16

TABLES OF MEANS

SERIES I

VARIETY SEQUENCE (VS)

1966	MP	PD	PD	MP	
1967	MP	MP	PD	PD	
1968	MP	PD	PD	MP	
1969	MP	MP	PD	PD	
1970	MP	PD	PD	MP	
1971	MP	MP	PD	PD	
1972	PC	PC	PC	PC	Mean
	TOTAL TUBERS: TONNES/HECTARE				
IRRIGATION (I)					
O	34.2	28.9	11.9	12.9	22.0
C	40.2	37.8	17.5	18.6	28.5
FUMIGANT 1966-71 (F)					
O	33.7	28.7	16.7	16.8	24.0
F	40.7	38.0	12.8	14.7	26.6
Mean	37.2	33.4	14.7	15.7	25.3

STANDARD ERRORS OF DIFFERENCES

VS	F	VS I*	VS F
2.74	1.94	3.87	4.26
Unless same level of VS			2.74

* Within same level of I only

Varieties MP = Maris Piper
PD = Pentland Dell
PC = Pentland Crown

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72/W/CS/16

SERIES I

VARIETY SEQUENCE (VS)

1966	MP	PD	PD	MP	
1967	MP	MP	PD	PD	
1968	MP	PD	PD	MP	
1969	MP	MP	PD	PD	
1970	MP	PD	PD	MP	
1971	MP	MP	PD	PD	
1972	PC	PC	PC	PC	Mean
	PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
IRRIGATION (I)					
O	86.9	86.9	80.9	74.5	82.3
C	93.0	92.5	84.8	83.1	88.3
FUMIGANT 1966-71 (F)					
O	89.1	87.9	83.4	80.1	85.1
F	90.9	91.4	82.3	77.5	85.5
Mean	90.0	89.7	82.9	78.8	85.3

Varieties MP = Maris Piper
PD = Pentland Dell
PC = Pentland Crown

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72/W/CS/16

SERIES IV

VARIETY SEQUENCE (VS)

1966 1967 1968 1969 1970 1971 1972	MP MP MP MP MP MP MP	MP PD MP PD MP PD MP	PD PD PD PD PD PD PD	PD MP PD MP PD MP PD	Mean
	TOTAL TUBERS: TONNES/HECTARE				
IRRIGATION (I)					
O C	34.1 43.5	30.5 37.8	17.6 22.7	33.2 38.5	28.9 35.6
FUMIGANT 1966-72 (F)					
O F	36.1 41.6	31.0 37.3	15.0 25.4	29.2 42.6	27.8 36.7
Mean	38.8	34.2	20.2	35.9	32.3

STANDARD ERRORS OF DIFFERENCES

VS	F	VS* I	VS F
1.78	1.26	2.51	3.86
Unless same level of VS			1.78

* Within same level of I only

Varieties MP = Maris Piper
PD = Pentland Dell

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72/W/CS/16

SERIES IV

VARIETY SEQUENCE (VS)

1966	MP	MP	PD	PD	
1967	MP	PD	PD	MP	
1968	MP	MP	PD	PD	
1969	MP	MP	PD	PD	
1971	MP	PD	PD	MP	
1972	MP	MP	PD	PD	Mean
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE					
IRRIGATION (I)					
O	86.5	90.9	64.8	85.1	81.8
C	89.1	92.6	77.9	85.8	86.3
FUMIGANT 1966-72 (F)					
O	85.1	93.7	65.9	79.8	81.1
F	90.5	89.8	76.8	91.1	87.0
Mean	87.8	91.8	71.3	85.4	84.1

Varieties MP = Maris Piper
PD = Pentland Dell

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72/W/CS/20

PLACEMENT OF FUMIGANT

Object: To study the cumulative effects of soil fumigation on Heterodera rostochiensis and yield of potatoes grown continuously for six years - Woburn Butt Furlong.

Sponsor: A.G. Whitehead.

The sixth year, potatoes.

For previous years see 67/C/34(t), 68/C/27(t), 69/W/CS/20, 70/W/CS/20(t) and 71/W/CS/20(t).

Whole plot dimensions: 2.13 x 4.57. Area harvested: 0.00098.

Treatments: **Fumigant:** 0 (0), 84 (1), 168 (2), 336 (4), 672 (8) kg (applied cumulatively to previous tretments).

NOTE: 'Telone' at 340 kg was applied to all dazomet treated plots.

Basal applications: 7.5 tonnes of magnesian limestone, 1410 kg (13:13:20). Weedkiller: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

Variety: Majestic.

Cultivations, etc.: Magnesian limestone applied, ploughed: 26 Oct, 1971. Deep-tine cultivated: 3 Nov. Dazomet and 'Telone' applied, all plots rotary cultivated: 16 Dec. Deep-tine cultivated, NPK applied, potatoes planted, inter-row rotary cultivated and earthed up: 19 Apr, 1972. Weedkiller applied: 15 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Lifted by hand: 21 Sept.

NOTE: Soil samples were taken after harvest for cyst and egg counts of Heterodera rostochiensis.

Standard error per plot.
Total tubers, tonnes/hectare: 3.11 or 10.2% (8 d.f.)

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72/W/CS/20

TABLE OF MEANS

FUMIGANT

0	1	2	4	8	Mean
TOTAL TUBERS: TONNES/HECTARE					
14.3	29.4	33.9	36.1	38.7	30.5

STANDARD ERROR OF DIFFERENCES
FUMIGANT 2.54

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

69.6	83.6	86.2	87.7	88.5	83.1

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72/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 formerly** Ophiobolus graminis) in continuous barley - West Barnfield II.

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

The fifth year, barley.

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

Whole plot dimensions: 5.33 x 20.1. Sub plot area harvested: 0.00264.

Seed: Julia sown at 160 kg.

Cultivations, etc.: Sprayed with paraquat at 0.42 kg ion in 220 l: 24 Sept, 1971. Ground chalk applied at 5000 kg: 1 Nov. Ploughed: 12 Nov. N, P and K applied, seed drilled: 29 Mar, 1972. Sprayed with ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l): 17 May. Combine harvested: 24 Aug.

NOTE: Samples were taken in spring and summer for estimation of incidence of root-rotting diseases.

Standard error per plot (pooled).
Grain, tonnes/hectare: 0.717 or 18.2% (39 d.f.)

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72/R/CS/24

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	P 0	1	4	6*	24*	Mean
K						
1	2.78	3.97	4.28	3.74	4.03	3.76
4	3.33	4.10	4.59	4.00	4.56	4.12
N						
1	2.86	3.59	4.12	3.76	4.74	3.81
2	2.58	4.00	5.02	3.90	3.89	3.88
3	3.75	3.78	4.14	3.94	4.92	4.10
4	3.01	4.78	4.46	3.91	3.63	3.96
Mean	3.05	4.04	4.44	3.87	4.29	3.94

	N 1	2	3	4
K				
1	3.35	4.23	3.59	3.87
4	4.28	3.53	4.61	4.05

* Applied 1968 only

STANDARD ERRORS OF DIFFERENCES

P	K	N	P K	P N	K N
0.254	0.161	0.227	0.359	0.508	0.321

Mean D.M. %: 81.9

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72/R/CS/24

GRAIN: TONNES/HECTARE

K	1					4				
P	0	1	4	6*	24*	0	1	4	6*	24*
N										
1	2.47	3.69	3.74	2.66	4.22	3.26	3.50	4.51	4.85	5.26
2	3.07	3.97	5.05	4.84	4.25	2.10	4.03	5.00	2.96	3.54
3	2.58	3.38	4.04	3.67	4.29	4.91	4.18	4.23	4.20	5.55
4	2.99	4.85	4.31	3.81	3.37	3.04	4.71	4.61	4.00	3.90

* Applied 1968 only

STANDARD ERROR OF DIFFERENCES

P
K
N

0.718

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72/R/CS/24

STRAW: TONNES/HECTARE

	P 0	1	4	6*	24*	Mean
K						
1	3.13	4.11	4.25	3.73	4.27	3.90
4	3.30	4.09	4.75	3.94	4.62	4.14
N						
1	2.97	3.38	3.14	3.32	3.85	3.33
2	2.94	4.20	4.73	3.79	4.41	4.02
3	3.42	4.28	5.34	4.18	4.90	4.42
4	3.53	4.54	4.79	4.03	4.63	4.30
Mean	3.22	4.10	4.50	3.83	4.45	4.02

	N 1	2	3	4
K				
1	3.25	4.02	4.21	4.12
4	3.41	4.01	4.64	4.49

Mean D.M. %: 87.0

K	1					4				
P	0	1	4	6*	24*	0	1	4	6*	24*
N										
1	2.98	3.25	3.35	3.08	3.61	2.96	3.52	2.94	3.57	4.08
2	2.96	4.26	4.67	3.90	4.32	2.92	4.14	4.80	3.69	4.50
3	3.10	4.28	4.60	4.10	4.96	3.74	4.28	6.09	4.26	4.84
4	3.47	4.67	4.40	3.84	4.21	3.59	4.41	5.19	4.23	5.05

* Applied 1968 only

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72/W/CS/33

RATES OF NEMATICIDES DOSAGE

Object: To study the residual effects on yield of potatoes of several nematicides applied at a range of rates (to potatoes 1969, sugar beet 1970, none to barley 1971) - Woburn Butt Close.

Sponsor: A.G. Whitehead.

The fourth year, potatoes.

For previous years see 69/W/CS/33(t), 70/W/CS/33(t) and 71/W/CS/33.

Whole plot dimensions: 2.84 x 9.14. Area harvested: 0.00065.

Basal applications: 1500 kg (13:13:20). Weedkillers: Paraquat at 0.56 kg ion in 280 l. Linuron at 1.1 kg with paraquat at 0.42 kg ion 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.24 kg in 430 l.

Variety: Pentland Crown.

Cultivations, etc.: Paraquat applied: 9 Sept, 1971. Ploughed twice: 21 Sept, 17 Feb, 1972. NPK applied: 31 Mar. Rotary cultivated, potatoes planted: 5 Apr. Weedkiller applied: 5 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 6 Sept. Lifted: 20 - 21 Sept.

NOTE: Soil samples were taken after harvest for cyst and egg counts of Heterodera rostochiensis.

Standard errors per plot. Total tubers, tonnes/hectare.
Whole plot: 4.59 or 15.2% (26 d.f.)
Sub plot: 4.03 or 13.3% (29 d.f.)

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72/W/CS/33

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

NEMATICIDE

APPLICATION	O	M	D1	D2	D3	D4	T1	T2	T3	T4	Z1	Z2	Z3	Z4	Mean
1969		33.6	31.4	19.1	21.7	30.0	27.0	17.4	32.3	27.8	22.4	35.7	31.7	32.8	27.9
1969-70		42.5	33.6	27.4	34.5	32.4	33.9	32.8	28.5	37.1	23.7	33.0	33.0	36.7	33.0
Mean	27.8	38.1	32.5	23.2	28.1	31.2	30.5	25.1	30.4	32.4	23.1	34.4	32.4	34.8	30.3*

* Grand mean

STANDARD ERRORS OF DIFFERENCES

	NEMATICIDE	APPLICATION	NEMATICIDE APPLICATION
	3.75	0.91	4.41
Unless same level of NEMATICIDE			3.29

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PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMATICIDE

APPLICATION	0	M	D1	D2	D3	D4	T1	T2	T3	T4	Z1	Z2	Z3	Z4	Mean
1969		94.5	94.0	87.9	91.1	92.8	91.2	87.7	93.7	93.3	90.7	93.2	92.1	92.0	91.9
1969-70		94.0	93.4	88.2	93.5	91.0	91.6	92.8	93.5	94.0	92.1	91.8	93.5	93.0	92.5
Mean	91.7	94.3	93.7	88.0	92.3	91.9	91.4	90.3	93.6	93.6	91.4	92.5	92.8	92.5	92.1*

* Grand mean

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72/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of three nematicides on incidence of Heterodera rostochiensis and yield of potatoes grown continuously for four years, residual effects of similar treatments in 1971 are studied in sugar beet - Woburn Great Hill II and III.

Sponsor: A.G.Whitehead.

The fourth year, potatoes, sugar beet.

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

Design: 4 series of 3 blocks of 10 plots.

NOTE: Series II received fresh treatments to potatoes, Series I tested residual effects on sugar beet, Series III and IV continued in untreated susceptible potatoes.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00130.

Treatments: None (0), together with all combinations of:-
(1) Nematicides. Series I: Applied to potatoes 1971: Aldicarb (A), Du Pont 1410 (D), Nemacur P (N),
Series II: Applied to potatoes 1972: Aldicarb (A), CGA 10576 (C), Du Pont 1410 (D).
(2) Rates: 2.8, 5.6, 11.0 kg a.i.

Basal applications:
Sugar beet: 5 tonnes magnesian limestone, 750 kg (0:14:28), 160 kg N as 'Nitro-Chalk', 180 kg MgO as Epsom salts, 6.7 kg B2O3, as 'Solubor', in 400 l. Weedkiller: Phenmedipham at 1.1 kg in 280 l. Insecticide: Demeton-s-methyl at 0.5 kg in 280 l.
Potatoes: 1510 kg (13:13:20). Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

Seed: Sugar beet: Klein E sown at 5.6 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Sugar beet: Magnesian limestone applied: 26 Oct, 1971. Deep-tine cultivated twice: 1 Nov, 17 Dec. N and PK applied: 22 Mar, 1972. Mg applied: 23 Mar. Seed drilled: 24 Mar. Weedkiller applied: 3 May. Singled: 22 - 23 May. Boron spray applied: 9 June. Insecticide applied: 29 June. Lifted: 6 - 7 Nov.

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Potatoes: Deep-tine cultivated twice: 1 Nov, 1971, 17 Dec. NPK applied: 29 Mar, 1972. Treatments applied to Series II, all potato series rotary cultivated and potatoes planted: 17 Apr. Weedkiller applied: 11 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 28 July. Haulm mechanically destroyed: Series II: 6 Sept, Series III and IV: 24 Aug. Lifted: Series III and IV: 12 - 14 Sept, Series II: 26 Sept.

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

Standard errors per plot.
Potatoes: Total tubers, tonnes/hectare: 2.37 or 7.3% (18 d.f.)
Sugar beet: Roots (washed), tonnes/hectare: 2.11 or 5.4% (18 d.f.)
Total sugar, tonnes/hectare: 0.414 or 5.9% (18 d.f.)

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72/W/CS/34

TABLES OF MEANS

POTATOES

RATE OF A.I: KG/HA

	2.8	6.0	11.0	Mean
NEMATICIDE 1972	TOTAL TUBERS: TONNES/HECTARE			
A	33.5	33.7	37.0	34.7
C	30.4	20.1	29.7	30.1
D	36.1	38.0	35.1	36.4
Mean	33.3	33.9	33.9	33.7

0 22.8

Grand mean: 32.6

STANDARD ERRORS OF DIFFERENCES

NEMATICIDE	RATE	NEMATICIDE RATE & 0
1.12	1.12	1.94

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

NEMATICIDE 1972

A	85.8	83.5	87.7	85.7
C	87.3	86.7	84.8	86.2
D	90.6	86.1	86.2	87.6
Mean	87.9	85.4	86.2	86.5

0 82.9

Grand mean: 86.1

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72/W/CS/34

SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

RATE OF A.I: KG/HA

	2.8	6.0	11.0	Mean
NEMATICIDE 1971				
A	40.3	38.7	38.6	39.2
D	37.8	41.0	36.2	38.4
N	39.7	38.4	40.9	39.7
Mean	39.3	39.4	38.6	39.1

0 37.5

Grand mean: 38.9

STANDARD ERRORS OF DIFFERENCES

NEMATICIDE	RATE	NEMATICIDE RATE & 0
1.00	1.00	0.73

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72/W/CS/34

SUGAR BEET

RATE OF A.I: KG/HA

	2.8	6.0	11.0	Mean
	SUGAR %			
NEMATICIDE 1971				
A	18.1	17.7	18.2	18.0
D	17.8	18.1	17.9	17.9
N	17.6	17.9	18.0	17.9
Mean	17.9	17.9	18.0	17.9

O 18.0

Grand mean: 17.9

TOTAL SUGAR: TONNES/HECTARE

NEMATICIDE 1971

A	7.32	6.85	7.04	7.07
D	6.73	7.41	6.49	6.88
N	7.01	6.86	7.37	7.08
Mean	7.02	7.04	6.97	7.01

O 6.74

Grand mean: 6.98

STANDARD ERRORS OF DIFFERENCES

NEMATICIDE	RATE	NEMATICIDE RATE & O
0.195	0.195	0.338

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72/W/CS/35

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on Heterodera rostochiensis and yield of potatoes grown continuously for four years - Woburn Stackyard A II.

Sponsor: A.G. Whitehead.

The fifth year of continuous potatoes - first year of treatments.

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

Whole plot dimensions: 4.27 x 6.10. Area harvested: 0.00087.

Treatments:

The experiment has 3 series all of which have grown untreated potatoes, susceptible to Heterodera rostochiensis, for the past four years. Only Series I received treatments in 1972. The other two series continued in untreated susceptible potatoes.

Treatments to Series I: All combinations of:-

1. Varieties: Maris Piper (1972), alternating in successive rotations with Pentland Crown (A), Pentland Crown, continuous in successive rotations (C).
2. Nematicides:
   - None (O)
   - Dazomet (half applied before and half after autumn ploughing) at 220 kg (D2), 330 kg (D3), 440 kg (D4), 660 kg (D6).
   - Dazomet at 220 kg, 'Telone' at 220 kg, applied after ploughing in autumn (D2T1)
   - 'Telone' at 450 kg applied after ploughing (T2)
   - 'Du Pont 1410' at 5.6 kg a.i. in spring (P)
   - 'Telone' at 220 kg after ploughing in autumn with 'Du Pont 1410' at 5.6 kg in spring (PT1)

Basal applications:- 1510 kg (13:13:20). Weedkiller: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

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Cultivations, etc.:-

Series I: Deep-tine cultivated: 5 Oct, 1971. First half dazomet applied, all plots rotary cultivated: 13 Dec. Ploughed: 14 Dec. Second half dazomet applied, all plots rotary cultivated, 'Telone' applied, all plots spring-tine cultivated: 15 Dec. NPK applied: 24 Mar, 1972. 'DuPont' 1410 applied: 17 Apr. Rotary cultivated, potatoes planted, inter-row rotary cultivated and earthed up: 18 Apr. Weedkiller applied: 11 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Haulm mechanically destroyed: 6 Sept. Lifted: 25 Sept.

Series II and III: Deep-tine cultivated: 5 Oct, 1971. Ploughed: 14 Dec. NPK applied: 24 Mar, 1972. Rotary cultivated, potatoes planted: 7 - 18 Apr. Weedkiller applied: 6 May. Rotary ridged: 3 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Haulm mechanically destroyed: 24 Aug. Lifted Series III: 30 Aug - 4 Sept. Series II: 4 Sept - 11 Sept.

NOTE: Soil samples were taken in autumn 1971 and after harvest for cyst and egg counts of Heterodera rostochiensis.

Standard error per plot.
Total tubers, tonnes/hectare: 2.96 or 9.2% (51 d.f.)

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72/W/CS/35

TABLES OF MEANS

NEMATICIDE

	0	D2	D3	D4	D6	D2T1	T2	P	PT1	Mean
VARIETY	TOTAL TUBERS: TONNES/HECTARE									
A	27.1	32.8	36.9	38.1	38.5	35.9	31.1	30.9	32.4	33.8
C	20.9	27.6	33.6	36.9	37.6	33.2	26.3	30.3	30.1	30.7
Mean	24.0	30.2	35.2	37.5	38.1	34.5	28.7	30.6	31.3	32.2

STANDARD ERRORS OF DIFFERENCES

VARIETY	NEMATICIDE	VARIETY NEMATICIDE
0.70	1.48	2.10

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

A	81.2	81.9	83.8	85.4	86.8	88.1	86.9	65.2	77.3	81.8
C	86.6	92.1	92.5	93.8	93.6	92.8	92.3	90.3	92.2	91.8
Mean	83.9	87.0	88.2	89.6	90.2	90.4	89.6	77.8	84.7	86.8

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72/R/CS/41

CULTIVATIONS AND SOIL INVERTEBRATES

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

Sponsor: C.A. Edwards.

The fourth year, old grass, new grass.

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

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

Seeds mixture for 1972: 1.7 kg British Certified Aberystwyth S215 Meadow Fescue, 1.1 kg British Certified Aberystwyth S53 Meadow Fescue, 1.1 kg British Certified Aberystwyth S48 Timothy, 0.42 kg British Uncertified Aberystwyth S100 White Clover, 0.14 kg English Old Pasture Wild White Clover. Mixture sown at 22 kg.

Cultivations, etc.:- Basal PK applied: 15 Nov, 1971. AMR plots ploughed: 22 Nov. SMR and SFR plots ploughed: 2 Mar, 1972. Basal NK applied: 13 Mar. Disced AMR and SMR plots four times, SFR plots twice, harrowed and rolled all plots for sowing: 24 Apr. Seed hand sown and harrowed in: 25 Apr. Sown plots rolled: 27 Apr. SFR, SMR and AMR plots sprayed with MCPB at 2.2 kg in 220 l. SFR, SMR and AMR plots topped: 18 July. SFR, SMR and AMR plots cut once: 11 Sept, other plots three times: 23 May, 19 July, 11 Sept. NK applied to all plots, except SFR, SMR and AMR: 25 May and to all plots: 25 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:	0.672 or 11.1%	(13 d.f.)
2nd cut:	0.416 or 15.7%	(13 d.f.)
3rd cut:	0.316 or 21.4%	(22 d.f.)
Total of 3 cuts:	0.851 or 8.6%	(13 d.f.)

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72/R/CS/41

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

	CULTIVATION					CULTIVATION			
	O*	SF	SM	AM	Mean	SFR	SMR	AMR	Mean
1ST CUT	5.82	5.81	5.94	6.85	6.05				
2ND CUT	2.53	2.56	2.69	2.91	2.64				
3RD CUT	1.23	1.11	1.01	1.25	1.17	2.11	2.01	1.82	1.47**
TOTAL OF 3 CUTS	9.58	9.38	9.73	11.01	9.86				

STANDARD ERRORS OF DIFFERENCES

CULTIVATION

	Excluding O	O v any of remainder
1ST CUT	0.336	0.412
2ND CUT	0.294	0.254
3RD CUT	0.223	0.193
TOTAL OF 3 CUTS	0.603	0.508

Mean D.M. %:	1st cut:	17.1
	2nd cut:	24.8
	3rd cut:	30.2
	Total of 3 cuts:	24.0

* Duplicated level

** Grand mean

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72/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 fourth year, old grass.

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

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

Treatments (T): One of the previously untreated (unsampled) plots in each block now receives treatment F3β4(F3β4*).

Basal applications: 505 kg (0:14:28) in winter, 440 kg (25:0:16) in spring, 224 kg (25:0:16) after each cut except the last.

Cultivations, etc.: PK applied: 15 Nov, 1971. NK applied: 13 Mar, 1972. Cut 3 times: 23 May, 20 July, 11 Sept. NK applied after the first 2 cuts.

Chemical treatments applied:

Chlorbenside:	17 Feb, 19 Apr, 12 May, 14 June, 13 July, 22 Aug, 14 Sept.
Menazon:	17 Feb, 18 Apr, 11 May, 14 June, 12 July, 21 Aug, 14 Sept, 25 Oct.
Dimethoate:	16 Feb, 19 Apr, 12 May, 14 June, 13 July, 22 Aug, 14 Sept, 26 Oct.
Parathion:	23 Feb, 19 Apr, 12 May, 14 June, 13 July, 22 Aug, 21 Sept, 26 Oct.
Metaldehyde:	16 Feb, 19 Apr, 12 May, 14 June, 12 July, 21 Aug, 14 Sept.
Aldrin:	8 Dec, 1971.
Chlordane:	8 Dec, 1971.

NOTES: (1) Formalin and C14421 were not applied in 1972.
(2) Samples were taken for botanical analysis. Samples for fauna were taken throughout the year.

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

1st cut:	0.565	or 9.6% (33 d.f.)
2nd cut:	0.231	or 8.3% (33 d.f.)
3rd cut:	0.217	or 17.5% (33 d.f.)
Total of 3 cuts:	0.696	or 7.0% (33 d.f.)

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72/R/CS/42

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

T	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
O	5.66	2.63	1.09	9.38
FCB	5.77	2.96	1.27	10.00
FMZ	5.97	2.75	1.26	9.97
F3	5.79	3.08	1.22	10.10
F3S4*	5.20	2.98	1.28	9.46
SFO	6.07	2.59	1.12	9.78
SL	5.98	2.75	1.37	10.10
SN	5.72	2.49	1.25	9.45
SMT	5.83	2.59	1.15	9.57
S3	6.13	2.93	1.53	10.59
S4	6.16	2.92	1.16	10.24
F3S4	6.21	2.94	1.25	10.39
STANDARD ERRORS OF DIFFERENCES				
T	0.399	0.164	0.154	0.492

Mean D.M. %: 1st cut: 17.2
2nd cut: 22.9
3rd cut: 30.1
Total of 3 cuts: 23.4

* Since 1972

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72/R/CS/44

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 - Long Hoos III.

Sponsors: G.V. Dyke, R.D. Prew.

The fourth year, barley.

For previous years see 69/R/CS/44(t), 70/R/CS/44(t) and 71/R/CS/44(t).

Design: 3 randomised blocks of 12 plots, split into 4.

Whole plot dimensions: 4.27 x 39.3. Area harvested: 0.00260.

Treatments (residual effects):-
Whole plots: Crops and nitrogen 1969:- Spring beans (2 plots per block) (BE), clover (2 plots per block) (CL) and all combinations of:-
1. Crops: Barley (B), oats (O).
2. Nitrogen: 50 (N1), 100 (N2) kg as 'Nitro-Chalk' in the seedbed.
3. Undersowing 1969: None (0), trefoil (T).

Sub plots:
4. Nitrogen 1970 and 1971 (cumulative): None, 50, 100, 150 kg as 'Nitro-Chalk'.

Basal applications: 440 kg (20:15:15) combine drilled.

Weedkillers: Paraquat at 0.56 kg ion in 220 l. Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seed: Julia (dressed with ethirimol) sown at 160 kg.

Cultivations, etc.: Paraquat applied: 9 Sept, 1971. Ploughed: 25 Nov. Seed combine drilled: 21 Mar, 1972. N applied: 17 Apr. 'Tetroxone' applied: 8 May. Combine harvested: 23 Aug.

NOTE: The weights of grain recorded for two of the blocks were erratic apparently because of a fault in the balance used. Grain from the third block was weighed on a different balance and these results only were used in the tables of means.

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72/R/CS/44

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N: KG/HA 1969		UNDERSOWING 1969		N: KG/HA 1970 & 71				
	50	100	0	T	0	50	100	150	Mean
CROP									
B	5.60	5.65	5.45	5.80	5.11	5.51	5.63	6.25	5.63
O	5.58	5.58	5.56	5.60	5.10	5.15	5.79	6.28	5.58
N: KG/HA 1969									
50			5.43	5.75	5.01	5.23	5.88	6.25	5.59
100			5.58	5.65	5.20	5.44	5.55	6.28	5.62
UNDERSOWING 1969									
0					5.11	5.19	5.48	6.24	5.50
T					5.10	5.47	5.95	6.30	5.70
Mean					5.10	5.33	5.71	6.27	5.60

CROP

BE	4.91	5.30	5.81	5.93	5.49
CL	5.65	5.65	5.72	6.11	5.78

Grand mean: 5.61
Mean D.M. % all plots: 87.1

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72/R/CS/49 and 72/W/CS/49

FUMIGANT AND N

Object: To study the direct and residual effects of formalin applied at different times on the development of take-all (Gaeumannomyces graminis*) on winter and spring sown wheat - Rothamsted (R) Furzefield and Woburn (W) Butt Close.

* Formerly known as Ophiobolus graminis.

Sponsor: G.A. Salt.

The third year, winter and spring wheat.

For previous years see 70/R&W/CS/49(t) and 71/R&W/CS/49(t).

Design (each field): A single replicate of 4 x 4 x 2 x 2 in 4 blocks of 4 plots split into 4.

Whole plot dimensions: 2.16 x 21.0. Sub plot area harvested: C.00064.

Treatments: All combinations of:-

Whole plots:

1. Crops, sowing dates and times of application of formalin (C): Maris Ranger winter wheat sown in autumn, formalin applied in early autumn (WWA), Maris Ranger sown in spring, formalin applied early autumn (WWS), Kolibri spring wheat sown in spring, formalin applied early autumn (WSS) or in early spring (WSS*).

Sub plots:

2. Nitrogen cumulative on 1970 and 1971 (N): 75, 125, 176, 226 kg N as 'Nitro-Chalk'.
3. Formalin in 1970 and 1972 (F02): None (0), formalin (F).
4. Formalin in 1971 (F1): None (0), formalin (F).
   The formalin was applied at 3000 l of 38% formaldehyde in all years. The dilution in 1972 was to 36000 l.

Basal applications: 340 kg (0:20:20) combine drilled. Weedkiller: Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 340 l on both fields but spring sown plots on Furzefield (R) received instead bromoxynil, ioxynil, dichlorporp and MCPA ('Tetroxone' at 5.6 l in 340 l) and on Butt Close (W) all plots also received paraquat at 0.56 kg ion in 280 l.

Seed: All sown at 190 kg.

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72/R/CS/49 and 72/W/CS/49

Cultivations, etc.:
Furzefield (R): Ploughed: 11 Oct, 1971. Formalin applied (WWA, WWS and WSS): 25 Oct. Winter wheat combine drilled: 5 Nov. Formalin applied (WSS*): 14 Mar, 1972. Spring sown wheat combine drilled: 29 Mar. N applied: 1 Apr. Weedkiller applied: 26 Apr (WWA plots) remainder: 17 May. Combine harvested: 5 Sept.
Butt Close (W): Paraquat applied: 9 Sept, 1971. Ploughed: 30 Oct. Formalin applied (WWA, WWS, WSS): 18 Oct. Winter wheat combine drilled: 1 Nov. Formalin applied (WSS*): 14 Mar, 1972. Spring sown wheat combine drilled: 17 Apr. Ioxynil and mecoprop applied to WWA plots: 26 Apr. N applied: 4 May. Ioxynil and mecoprop applied to WWS, WSS and WSS* plots: 22 May. Combine harvested: 1 Sept.

NOTE: Incidence of root pathogens was recorded in spring and at harvest.

Standard errors per plot. Grain, tonnes/hectare:

Furzefield (R):	Whole plot:	0.644 or 15.6%	(7 d.f.)
	Sub plot:	0.447 or 10.8%	(23 d.f.)
Butt Close (W):	Whole plot:	0.190 or 10.1%	(7 d.f.)
	Sub plot:	0.385 or 20.5%	(23 d.f.)

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72/R/CS/49 and 72/W/CS/49

TABLES OF MEANS

FURZEFIELD (R)

GRAIN: TONNES/HECTARE

	N: KG/HA				FO2		F1		
	75	125	176	276	0	F	0	F	Mean
C									
WWA	4.73	5.08	4.77	4.26	4.57	4.84	4.82	4.59	4.71
WWS	3.78	3.60	3.30	3.53	3.51	3.59	3.50	3.60	3.55
WSS	3.76	4.01	4.20	4.35	3.82	4.34	4.05	4.11	4.08
WSS*	4.26	4.16	4.05	4.21	4.05	4.28	4.25	4.09	4.17
			N: KG/HA						
			75		4.05	4.22	4.40	3.87	4.13
			125		3.92	4.51	3.99	4.43	4.21
			176		4.19	3.97	3.92	4.24	4.08
			276		3.81	4.36	4.32	3.85	4.09
					FO2				
					0		4.11	3.87	3.99
					F		4.21	4.32	4.26
Mean							4.16	4.10	4.13

STANDARD ERRORS OF DIFFERENCES

C	N	FO2	F1	C N	C FO2	C F1	N FO2	N F1	FO2 F1
0.455	0.158	0.112	0.112	0.531	0.482	0.482	0.223	0.223	0.158
Unless same level of C				0.316	0.223	0.223			

Mean D.M. %: 83.0

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72/R/CS/49 and 72/W/CS/49

BUTT CLOSE (W)

GRAIN: TONNES/HECTARE

	N: KG/HA				FO2		F1		
	75	125	176	276	0	F	0	F	Mean
C									
WWA	2.14	2.80	2.83	2.75	1.96	3.29	2.96	2.29	2.63
WWS	1.86	1.91	1.49	1.32	1.51	1.78	1.66	1.63	1.64
WSS	2.00	1.73	1.73	1.34	1.63	1.77	1.82	1.57	1.70
WSS*	1.64	1.71	1.42	1.43	1.61	1.49	1.55	1.55	1.55
			N: KG/HA						
			75		1.55	2.26	1.93	1.89	1.91
			125		1.87	2.20	2.14	1.92	2.03
			176		1.76	1.98	2.05	1.69	1.87
			276		1.54	1.88	1.88	1.54	1.71
					FO2				
					0		1.73	1.63	1.68
					F		2.27	1.89	2.08
Mean							2.00	1.76	1.88

STANDARD ERRORS OF DIFFERENCES

C	N	FO2	F1	C N	C FO2	C F1	N FO2	N F1	FO2 F1
0.134	0.136	0.096	0.096	0.271	0.191	0.191	0.192	0.192	0.136
Unless same level of C				0.273	0.193	0.193			

Mean D.M. %: 83.1

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72/W/CS/52

FUMIGANTS, TEMIK AND N

Object: To study cumulative and residual effects of dazomet, formalin and aldicarb, at a range of nitrogen levels, on nematodes and yield of spring wheat - Woburn Butt Close.

Sponsor: T.D. Williams.

The second year, spring wheat.

For previous year see 71/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: None (O), dazomet 380 kg (D), formalin (38% formaldehyde) 2990 l (F), aldicarb ('Temik') 9 kg (T).
2. Nitrogen cumulatively on 1971: 63, 126, 189 kg N 'Nitro-Chalk'.

Sub plots:
3. Years of application of fumigants: 1971 only, none 1972 (R). 1971 and 1972 cumulatively (C).

Basal applications: 390 kg (0:20:20) combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 280 l. Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l.

Seed: Kleiber sown at 190 kg.

Cultivations, etc.: Paraquat applied: 10 Sept, 1971. Ploughed: 21 Sept. Dazomet applied, all plots rotary cultivated: 29 Sept. Formalin applied: 16 Nov. Ploughed: 14 Feb, 1972. Aldicarb applied, seed combine drilled: 15 Mar. N applied: 17 Mar. Ioxynil and mecoprop applied: 3 May. Combine harvested: 1 Sept.

NOTE: 1. Plant samples were taken in May for counts of root invasion by nematodes and fresh top weights.
2. Crop samples were taken in June for N percentages and roots were examined for soil pathogens.
3. Leaf samples were taken in June for copper analyses.

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.338 or 20.3% (33 d.f.)
Sub plot: 0.376 or 22.6% (39 d.f.)

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72/W/CS/52

APPLICATION			R			C	
FUMIGANT	O	D	F	T	D	F	T
N: KG/HA	GRAIN: TONNES/HECTARE						
63	1.58	1.84	1.74	2.32	1.94	2.03	3.49
126	1.34	1.28	1.27	1.79	1.51	1.27	3.12
189	1.27	1.03	1.31	1.42	1.46	1.27	1.51

STANDARD ERRORS OF DIFFERENCES

	N FUMIGANT APPLICATION
O	0.208
Excluding O	0.294
O v any of remainder	0.254
Unless same level of N and FUMIGANT	
Excluding O	0.242

N: KG/HA	STRAW: TONNES/HECTARE						
63	2.75	2.46	2.62	3.06	2.47	2.83	3.41
126	2.31	2.54	2.08	2.72	2.53	2.24	3.63
189	2.28	2.13	2.13	2.28	2.10	2.26	2.47

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72/W/CS/52

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	FUMIGANT				APPLICATION		
	O	D	F	T	R	C	Mean
N: KG/HA							
63	1.58	1.89	1.88	2.91	1.97	2.49	2.06
126	1.34	1.39	1.27	2.46	1.45	1.97	1.61
189	1.27	1.25	1.29	1.46	1.25	1.41	1.32
				FUMIGANT			
				O			1.40
				D	1.38	1.64	1.51
				F	1.44	1.52	1.48
				T	1.84	2.71	2.27
Mean					1.56	1.95	1.67

Note The N x APPLICATION table is meaned over D, F and T only

STANDARD ERRORS OF DIFFERENCES

N	FUMIGANT	APPLICATION
0.117	0.135	0.098

	N FUMIGANT	N APPLICATION	FUMIGANT APPLICATION
Unless same level of	0.267	0.190	0.170
N		0.170	
FUMIGANT			0.140

Mean D.M. %: 82.7

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72/W/CS/52

STRAW: TONNES/HECTARE

	FUMIGANT				APPLICATION		
	O	D	F	T	R	C	Mean
N: KG/HA							
63	2.75	2.46	2.72	3.23	2.71	2.90	2.79
126	2.31	2.54	2.16	3.17	2.45	2.80	2.55
189	2.28	2.11	2.20	2.37	2.18	2.28	2.24
				FUMIGANT			
				O			2.45
				D	2.37	2.37	2.37
				F	2.28	2.44	2.36
				T	2.68	3.17	2.93
Mean					2.45	2.66	2.53

Note The N x APPLICATION table is meaned over D, F and T only

Mean D.M.%: 86.6

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72/W/CS/55

FUMIGATION AND N

Object: To study the 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 fourth year, spring beans.

For previous years see 69/W/BE/1(t) and 70-71/W/CS/55.

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

Basal applications: 7.5 tonnes magnesian limestone, 400 kg (0:14:28).
Insecticide: Demeton-s-methyl at 0.25 kg in 340 l.

Seed: Minor sown at 220 kg.

Cultivations, etc.: Ploughed: 14 Sept, 1971. Dazomet applied, all plots rotary cultivated, rolled: 21 Sept. Magnesian limestone applied: 26 Oct. Ploughed second time: 14 Feb, 1972. Fertiliser placed, seed drilled: 20 Mar. First half N applied: 22 Mar. Second half N applied: 16 May. Insecticide applied: 27 June. Hand harvested: 26 Sept.

NOTES: (1) Soil samples taken for counts of ectoparastic nematodes.
(2) Plant samples taken for observations of fungal pathogens.
(3) Counts made of germination %, number of stems and pods before harvest, 1000 grain weights and % nitrogen in grain.

Standard error per plot.
Grain, tonnes/hectare: 0.356 or 33.3% (10 d.f.)

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72/W/CS/55

TABLES OF MEANS

GRAIN: TONNES/HECTARE

N: KG/HA 1969-72

	0	126	252	Mean
DAZOMET: KG/HA 1969-72				
0	0.70	0.30	0.33	0.44
450	1.45	1.76	1.88	1.70
Mean	1.08	1.03	1.10	1.07

STANDARD ERRORS OF DIFFERENCES

DAZOMET	N	DAZOMET N
0.168	0.206	0.291

Mean D.M. %: 83.4

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72/W/CS/56

NEMATODES AND VERTICILLIUM

Object: To study the residual effects of methyl bromide (applied 1969 and 1971) and aldicarb and benomyl (applied 1969 only) (C) on winter wheat - Woburn Broad Mead I.

Sponsors: D.C.M. Corbett, G.A. Hide.

The fourth year, winter wheat.

For previous years see 69/W/P/2(t), 70/W/CS/56(t) and 71/W/CS/56(t).

Design: 4 blocks of 6 plots.

Whole plot dimensions: 2.67 x 13.4. Area harvested: 0.00191.

Basal applications: 290 kg (0:20:20) combine drilled, 440 kg 'Nitro-Chalk'. Weedkiller: 2,4-D at 0.70 kg plus dichlorprop at 2.8 kg in 280 l.

Seed: Cappelle sown at 170 kg..

Cultivations, etc.: Deep-tine cultivated on 2 occasions: 16 Sept, 9 Oct, 1971. Seed combine drilled: 15 Oct. Weedkiller applied: 31 Mar, 1972. N applied: 17 Apr. Combine harvested: 1 Sept.

NOTE: Grain samples were taken for analysis of methyl bromide residues.

Standard error per plot.
Grain, tonnes/hectare: 0.435 or 6.1% (15 d.f.)

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72/W/CS/56

TABLE OF MEANS

GRAIN: TONNES/HECTARE

C

00	MO	MW	TO	M1	M2	Mean
7.34	7.26	7.32	6.82	7.24	7.13	7.19

STANDARD ERROR OF DIFFERENCES
C 0.308

Mean D.M. %: 85.0

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72/R/CS/58

CROP SEQUENCES AND TAKE-ALL

Object: To study the seasonal changes in amounts of take-all (Gaeumannomyces graminis*) in continuous spring wheat and to compare these with behaviour after break crops - Harwoods Piece.

* Formerly known as Ophiobolus graminis.

Sponsor: D. Hornby.

The third year, spring wheat.

For previous years see 70/R/CS/58(t) and 71/R/CS/58(t).

Design: 3 randomised blocks of 3 plots, split into 4.

Whole plot dimensions: 4.27 x 63.7. Sub plot area harvested: 0.00280.

Treatments: Crop sequences (CS):-

1970 to whole plots	1971 to half plots	1972 to whole plots
Spring wheat (WS)	Spring wheat (WS) on both half plots	Spring wheat (WS)
Spring beans (BE)	Spring wheat (WS), spring beans (BE)	Spring wheat (WS)
Fallow (F)	Spring wheat (WS), fallow (F)	Spring wheat (WS)

Half plots were divided into quarter plots for sampling: None (0) and sampled (S). The same quarter plots were sampled each year. The continuous spring wheat was sampled on only one quarter plot per block.

Basal applications: 440 kg (20:15:15) combine drilled. Weedkiller: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 220 l.

Seed: Kleiber sown at 190 kg.

Cultivations, etc.: Ploughed: 18 Nov, 1971. Seed combine drilled: 22 Mar, 1972. Weedkiller applied: 17 May. Combine harvested: 5 Sept.

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NOTE: Soil samples were taken throughout the year and crop samples throughout the season and the following observations made:
Estimates of take-all (Gaeumannomyces graminis) in the soil, in wheat seedlings and in wheat plants.
Growth stages of wheat.

Standard error per plot. Grain, tonnes/hectare:
Whole plot: 0.154 or 2.8% (11 d.f.)
Sub plot: 0.296 or 5.4% (13 d.f.)

TABLE OF MEANS

GRAIN: TONNES/HECTARE

CS

1970 1971	BE BE	BE WS	F F	F WS	WS* WS	Mean
SAMPLING						
0	6.16	5.42	5.88	5.58	5.36	5.63
S	5.31	5.08	5.59	5.11	5.17	5.24
Mean	5.73	5.25	5.74	5.34	5.26	5.43

Mean D.M. %: 81.2

STANDARD ERRORS OF DIFFERENCES

CS	Excluding WS WS	0.126
	WS WS v any of remainder	0.109
SAMPLING		0.099
CS	Excluding WS WS	0.212
SAMPLING	WS WS v any of remainder	0.184
	Unless same levels of CS	
	Excluding WS WS	0.242
	WS WS	0.171

* Duplicated treatment

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72/R/CS/59

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 - Geescroft.

Sponsors: G.V. Dyke, R.D. Prew.

The third year, barley.

For previous years see 70/R/CS/59 (t) and 71/R/CS/59(t).

Design: 3 randomised blocks of 14 plots, split into 4.

Whole plot dimensions: 4.27 x 33.2. Sub plot area harvested: 0.00215.

Treatments:
Whole plots: Crops and nitrogen 1970:-
Maize receiving N at 100 (Maize 2), 200 (Maize 4) kg as 'Nitro-Chalk' in seedbed, spring beans (2 plots per block), clover (2 plots per block) (Extra) and all combinations of:-
1. Crops: Barley, oats
2. Undersowing (U): None, trefoil
3. Nitrogen (Res N): 50 (1), 100 (2) kg N as 'Nitro-Chalk' in seedbed.

Sub plots:
4. Nitrogen 1971 and 1972 (N): 0, 50, 100, 150 kg N as 'Nitro-Chalk'.

Basal applications: 310 kg (0:20:20) combine drilled. Weedkiller: Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).

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

Cultivations, etc.: Ploughed: 11 Nov, 1971. Seed combine drilled: 21 Mar, 1972. N applied: 17 Apr. Weedkiller applied: 8 May. Combine harvested: 23 Aug.

NOTE: Estimates were made of take-all (Gaeumannomyces graminis formerly known as Ophiobolus graminis) and eyespot (Cercosporella herpotrichoides).

Standard errors per plot. Grain, tonnes/hectare:
Whole plot: 0.318 or 5.6% (28 d.f.)
Sub plot: 0.814 or 14.2% (90 d.f.)

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72/R/CS/59

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CROP	UNDERSOWING (U) None	Trefoil	N: KG/HA 1970 (RES N) 50	100	N: KG/HA 1971 and 1972 (N) 0	50	100	150	Mean
Barley	5.50	5.87	5.76	5.60	4.75	6.23	5.99	5.76	5.68
Oats	5.79	5.75	5.67	5.87	4.48	6.24	6.30	6.05	5.77
UNDERSOWING (U)									
None			5.65	5.63	4.47	6.32	5.93	5.84	5.64
Trefoil			5.78	5.84	4.76	6.15	6.36	5.97	5.81
N: KG/HA 1970 (RES N)									
50					4.56	6.19	6.32	5.78	5.71
100					4.66	6.28	5.98	6.03	5.74
Mean					4.61	6.24	6.15	5.91	5.73

N: KG/HA 1971 and 1972 (N)

EXTRA	0	50	100	150	Mean
Maize 2	3.48	6.21	6.69	5.29	5.42
Maize 4	3.98	6.83	7.08	5.64	5.88
Beans	4.39	6.13	6.61	6.00	5.78
Clover	4.09	5.84	6.40	6.36	5.67
Mean	4.07	6.17	6.63	5.94	5.70

Grand mean: 5.72
Mean D.M. %: 85.6

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STANDARD ERRORS OF DIFFERENCES

CROP	U	RES N	N
0.130	0.130	0.130	0.235

CROP U	CROP RES N	CROP N	U RES N	U N	RES N N
0.184	0.184	0.313	0.184	0.313	0.313

Unless same level of

CROP		0.324			
U				0.324	
RES N					0.324

EXTRA x N table

	EXTRA	N	EXTRA N
Maize 2 v Maize 4	0.260	0.271	0.632
Beans v clover	0.184		0.447
Maize 2 or 4 v Beans or clover	0.225		0.547
Unless same level of EXTRA			
Maize 2 or 4			0.665
Beans or clover			0.460

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72/R/CS/61

FUNGICIDES

Object: To study the effects of three fungicides on yield and pathogens of old grass - Road Piece.

Sponsors: D.B. Slope, E.W. Broom.

The second year, old grass.

For previous year see 71/R/CS/61(t).

Design: 3 randomised blocks of 4 plots, split into 2.

Whole plot dimensions: 5.49 x 7.32. Sub plot area harvested: 0.00074.

Treatments: All combinations of:-
Whole plots: 1. Fungicides (F): None (0), benomyl at 1.12 kg (B), carboxin at 1.12 kg (C), mancozeb at 1.12 kg (M).
Sub plots: 2. Nitrogen (N): 125 kg N in spring plus 75 kg after each cut except the last (2), 188 kg N in spring plus 113 kg N after each cut except the last (3). All N was applied as NK compound (25:0:16).
The fungicides were each applied in 280 l on 2 occasions (26 June, 1972 and 16 Aug).

Basal applications: 500 kg (0:14:28) in winter.

Cultivations, etc.: PK applied: 15 Nov, 1971. NK applied: 13 Mar, 1972. Cut 3 times: 23 May, 20 July, 14 Sept. NK applied after each cut except the last.

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

1st cut:	Whole plot:	0.328 or 4.9% (6 d.f.)
	Sub plot:	0.406 or 6.1% (8 d.f.)
2nd cut:	Whole plot:	0.148 or 4.9% (6 d.f.)
	Sub plot:	0.188 or 6.2% (8 d.f.)
3rd cut:	Whole plot:	0.167 or 15.5% (6 d.f.)
	Sub plot:	0.126 or 11.8% (8 d.f.)
Total of 3 cuts:	Whole plot:	0.368 or 3.4% (6 d.f.)
	Sub plot:	0.519 or 4.8% (8 d.f.)

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72/R/CS/61

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

	N		
	2	3	Mean
F			
O	6.51	6.68	6.59
B	5.91	6.72	6.31
C	7.27	6.37	6.82
M	6.76	6.88	6.82
Mean	6.61	6.66	6.64

STANDARD ERRORS OF DIFFERENCES

F	N	F N
0.268	0.166	0.356
Unless same levels of F		0.331

Mean D.M. %: 17.7

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72/R/CS/61

DRY MATTER: TONNES/HECTARE

2ND CUT

	N		
	2	3	Mean
F			
O	2.93	3.10	3.01
B	3.05	3.08	3.07
C	3.12	2.70	2.91
M	3.24	3.06	3.15
Mean	3.09	2.98	3.04

STANDARD ERRORS OF DIFFERENCES

F	N	F N
0.121	0.077	0.162
Unless same levels of F		0.153

Mean D.M. %: 22.9

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72/R/CS/61

DRY MATTER: TONNES/HECTARE

3RD CUT

F	N 2	3	Mean
O	1.21	1.01	1.11
B	0.93	1.01	0.97
C	1.12	1.00	1.06
M	1.19	1.04	1.11
Mean	1.11	1.02	1.06

STANDARD ERRORS OF DIFFERENCES

	F	N	F N
	0.136	0.051	0.154
Unless same levels of F			0.103

Mean D.M. %: 23.7

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72/R/CS/61

DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

	N		
	2	3	Mean
F			
O	10.64	10.79	10.72
B	9.89	10.81	10.35
C	11.51	10.07	10.79
M	11.19	10.98	11.09
Mean	10.81	10.66	10.74

STANDARD ERRORS OF DIFFERENCES

F	N	F N
0.301	0.212	0.424
Unless same levels of F		0.424

Mean D.M. %: 21.4

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72/W/CS/63

NEMATODES AND VERTICILLIUM

Object: To study the residual effects of methyl bromide, aldicarb and benomyl (applied 1970) on winter wheat - Woburn Broad Mead I.

The third year, winter wheat.

Sponsors: D.C.M. Corbett, G.A. Hide.

For previous years see 70/W/P/2(t) and 71/W/CS/63.

Design: 4 blocks of 4 plots.

Whole plot dimensions: 2.67 x 13.4. Area harvested: 0.00191.

Treatments:-
Residues of chemicals applied to potatoes 1970, (none in 1971 or 1972), (C). None (O), methyl bromide at 975 kg (M), aldicarb at 7 kg (T), benomyl at 22 kg (B).

Basal applications: 290 kg (0:20:20) combine drilled, 440 kg 'Nitro-Chalk'. Weedkiller: 2,4-D at 0.7 kg plus dichlorprop at 2.8 kg in 280 l.

Seed: Cappelle sown at 170 kg.

Cultivations, etc.:
Deep-tine cultivated on two occasions: 16 Sept, 9 Oct, 1971.
Seed combine drilled: 15 Oct. Weedkiller applied: 31 Mar, 1972.
N applied: 17 Apr. Combine harvested: 1 Sept.

NOTE: Grain samples were taken for determination of residues of methyl bromide.

Standard error per plot.
Grain, tonnes/hectare: 0.272 or 3.5% (9 d.f.)

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72/W/CS/63

TABLE OF MEANS

GRAIN: TONNES/HECTARE

	C			
O	B	M	T	Mean
7.71	7.83	7.62	7.75	7.73

STANDARD ERROR OF DIFFERENCES
C 0.193

Mean D.M. %: 84.6

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72/W/CS/64

FUMIGANTS AND DITYLENCHUS

Object: To study the residual effects of a range of rates of aldicarb and dazomet (applied to onions 1971) on incidence of Ditylenchus dipsaci and yield of a second crop of onions - Woburn Butt Close.

Sponsor: A.G. Whitehead.

The second year, onions.

For previous year see 71/W/CS/64(t).

Design: 3 blocks of 10 plots.

Whole plot dimensions: 1.52 x 6.10.

Treatments: No fresh treatments were applied.

Basal applications: 1880 kg (13:13:20)
Irrigation (mm water):

27 Apr	3 mm	
4 May	3 mm	
9 June	6 mm	Total 12 mm.

Variety: Robusta sown at 7 kg.

Cultivations, etc.: Ploughed: 2 Nov, 1971. NPK applied: 13 Mar, 1972.
Seed drilled: 17 Mar.

NOTES: (1) The crop failed and the whole area was rotary cultivated. No yields were taken.
(2) Crop and soil samples were taken for counts of Ditylenchus dipsaci.

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72/W/CS/66

DAZOMET AND NITROGEN

Object: To study the cumulative effects of dazomet and nitrogen on yield and pathogens of maize - Woburn Butt Furlong.

Sponsors: A.J. Barnard, D. Hornby.

The second year, maize.

For previous year see 71/W/CS/66(t).

Design: 4 blocks of 2 plots split into 4.

Whole plot dimensions: 2.13 x 16.5.

Treatments, cumulative in 1971:
Whole plots: 1. Dazomet: None, 450 kg.
Sub-plots: 2. Nitrogen: 50, 100, 150 kg N at planting, 100 kg N at planting plus 50 kg N at tasselling.

Basal applications: 7.5 tonnes magnesian limestone, 870 kg (0:14:28).

Seed: Pioneer 131 sown at 30 kg.

Cultivations, etc.: Magnesian limestone applied: 4 Nov, 1971. Ploughed: 5 Nov. Dazomet applied, all plots rotary cultivated twice: 17 Nov. Ploughed: 14 Feb, 1972. PK applied: 18 Apr. Power harrowed, seed drilled: 26 Apr. N applied: 3 May.

NOTES: (1) The crop was severely damaged by birds and mice and the whole area was rotary cultivated. No yields were taken.
(2) Soil samples were taken in autumn before dazomet was applied, and in spring before sowing for counts of ectoparasitic nematodes.

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72/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 second year, winter wheat.

For previous year see 71/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:
Whole plots: Crops and nitrogen 1971 (CR):-
Maize (MA) receiving N at 100 (N2), 200 (N4) kg as 'Nitro-Chalk' in the seedbed, spring beans (2 plots per block) (BE), clover (2 plots per block) (CL) together with all combinations of:-
1. Crops: Barley (B), oats (O), each receiving N at 50 kg (N1) as 'Nitro-Chalk' in the seedbed.
2. Undersowing: None (O), trefoil (T).

Sub plots:
3. Nitrogen 1972: None, 50, 100, 150 kg N as 'Nitro-Chalk'.

Basal applications: 310 kg (0:20:20) combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Seed: Joss Cambier sown at 200 kg.

Cultivations, etc.: Corrective K applied: 29 Oct, 1971. Ploughed: 1 Nov. Seed combine drilled: 2 Nov. N applied: 5 Apr, 1972. Weedkiller applied: 28 Apr. Combine harvested: 29 Aug.

NOTE: Samples were taken for estimation of take-all (Gaeumannomyces graminis) and eyespot (Cercosporella herpotrichoides). Samples of grain were taken for sieving and % N.

Standard errors per plot.
Grain, tonnes/hectare: Whole plot: 0.130 or 2.6% (20 d.f.)
Sub plot: 0.329 or 6.6% (66 d.f.)

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72/R/CS/74

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CR

	BN1O	BN1T	ON1O	ON1T	MAN2	MAN4	BE	CL	Mean
N: KG/HA									
0	2.26	3.93	3.19	4.25	4.23	5.28	4.54	5.74	4.37
50	3.93	4.73	5.13	5.29	5.59	5.84	5.48	6.06	5.36
100	5.17	4.90	5.54	5.69	5.40	5.37	5.51	5.21	5.35
150	4.56	4.49	5.09	5.03	5.03	4.78	4.95	4.60	4.81
Mean	3.98	4.51	4.74	5.07	5.06	5.32	5.12	5.41	4.97

Mean D.M.%: 84.5

STANDARD ERRORS OF DIFFERENCES

CR

Excluding BE v CL	0.106
BE v CL	0.075
BE or CL v REMAINDER	0.092
N	0.085

CR
N

Excluding BE and CL	0.256
BE and CL	0.181
BE or CL v REMAINDER	0.218
Unless same level of CR	
Excluding BE and CL	0.269
BE and CL	0.190

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72/R/CS/76 and 72/W/CS/76

RATES OF NPK FERTILISER

Object: To study the residual effects of a range of rates of compound NPK fertiliser, applied to potatoes in 1971, on the yield of wheat. The direct effects of nitrogen are also studied - Rothamsted (R) Long Hoos III and Woburn (W) Lansome II.

Sponsor: F.V. Widdowson.

The second year, winter wheat.

For previous year see 71/R&W/CS/76(t).

Design: 4 x 2 x 2 x 2 in 2 blocks of 8 plots split into 2.

Whole plot dimensions:
Long Hoos III (R) and Lansome II (W): 4.27 x 21.0. Sub plot area harvested: 0.00286.

Treatments: All combinations of:-
Whole plots: 1. Rates of compound fertiliser (13:13:20) to potatoes in 1971: 1260, 1880, 2510, 3140 kg.
2. Spacing of potatoes within the rows in 1971: 30 cm (12 inches), 45 cm (18 inches).
Sub plots: 3. Variety of potatoes in 1971:
Long Hoos III (R): King Edward (KE), Pentland Crown (PC).
Lansome II (W): Pentland Crown (PC), Record (R).
4. Nitrogen to wheat in 1972:
Long Hoos III (R): 38, 76 kg N as 'Nitro-Chalk'.
Lansome II (W): 63, 126 kg N as 'Nitro-Chalk'.

Basal applications:
Long Hoos III (R): Manures: None. Weedkillers: Ioxynil at 0.63 kg plus mecoprop at 1.89 kg in 220 l.
Lansome II (W): 2,4-D at 0.70 kg plus dichlorprop at 2.8 kg in 280 l.

Seed: Cappelle sown at 200 kg (R), 180 kg (W).

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72/R/CS/76 and 72/W/CS/76

TABLES OF MEANS

LONG RDOS III (R)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1260	1880	2510	3140	Mean
	GRAIN: TONNES/HECTARE				
SPACING: CM					
30	7.07	7.08	7.39	7.43	7.24
45	6.98	7.23	7.19	7.43	7.21
VARIETY					
KE	7.10	7.21	7.29	7.24	7.21
PC	6.95	7.11	7.30	7.61	7.24
N: KG/HA					
38	6.76	6.90	6.99	7.35	7.00
76	7.30	7.41	7.60	7.50	7.45
Mean	7.03	7.16	7.29	7.43	7.23

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	N
0.173	0.122	0.087	0.087

	F SPACING	F VARIETY	F N
	0.244	0.212	0.212
Unless same level of F		0.174	0.174

Mean D.M. %: 85.5

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72/R/CS/76 and 72/W/CS/76

Cultivations, etc.:
Long Hoos III (R): Deep-tine cultivated twice: 6 Oct, 1971. Seed drilled: 11 Oct. N applied: 6 Apr, 1972. Weedkiller applied: 28 Apr. Combine harvested: 31 Aug.
Lansome II (W): Deep-tine cultivated on 2 occasions: 6 Oct and 9 Oct, 1971. Seed drilled: 22 Oct. N applied: 12 Apr, 1972. Weedkiller applied: 27 Apr. Combine harvested: 31 Aug.

NOTE: The percentage of N in the grain was determined.

Standard errors per plot. Grain, tonnes/hectare:

Long Hoos III (R):	Whole plot:	0.244 or 3.4%	(6 d.f.)
	Sub plot:	0.247 or 3.4%	(6 d.f.)
Lansome II (W):	Whole plot:	0.314 or 7.4%	(6 d.f.)
	Sub plot:	0.421 or 9.9%	(6 d.f.

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72/R/CS/76 and 72/W/CS/76

LANSOME II (W)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1260	1880	2510	3140	Mean
	GRAIN: TONNES/HECTARE				
SPACING: CM					
30	4.36	4.23	4.25	3.99	4.21
45	4.25	4.18	4.07	4.62	4.28
VARIETY					
PC	4.26	4.18	4.20	4.49	4.28
R	4.36	4.23	4.12	4.13	4.21
N: KG/HA					
63	3.79	3.72	3.82	3.97	3.83
126	4.82	4.69	4.50	4.65	4.67
Mean	4.31	4.21	4.16	4.31	4.25

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	N
0.222	0.157	0.149	0.149

	F SPACING	F VARIETY	F N
	0.314	0.306	0.306
Unless same level of F		0.298	0.298

Mean D.M. %: 81.9

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72/W/CS/77

MUCH FERTILISER AND FYM

Object: To study the residual effects of large dressings of FYM and NPK fertiliser applied to potatoes 1971, on the yields of a following winter wheat - Woburn Stackyard C.

Sponsor: F.V. Widdowson.

The second year, winter wheat.

For previous year see 71/W/CS/77(t).

Design: 3 blocks of 12 plots split into 2.

Whole plot dimensions: 2.74 x 3.05. Area harvested: 0.00033.

Treatments: All combinations of:-

Whole plots: 1. Residues of FYM, fertiliser and methods of application to potatoes 1971 (T):

F1D, F2D, F4D, F6D, F2S, F4S, D2, D4, D2F2D, D2F4D, D4F2D, D4F4D.

D2:D4 = 40: 80 tonnes FYM dug in.

F1 = 126 kg N, 188 kg P_2O_5, 188 kg K_2O.

F2 = 252 kg N, 376 kg P_2O_5, 376 kg K_2O.

F4 = 504 kg N, 752 kg P_2O_5, 752 kg K_2O.

F6 = 756 kg N, 1130 kg P_2O_5, 1130 kg K_2O.

D:S = 'Nitro-Chalk' rotary cultivated in, (0:20:20) dug in: 'Nitro-Chalk' and (0:20:20) raked in shallowly after rotary cultivation.

Sub plots: 2. Nitrogen to winter wheat 1972: 63 kg, 126 kg N as 'Nitro-Chalk'.

Basal applications: Weedkiller: 2,4-D at 0.42 kg with dichlorprop at 1.7 kg in 340 l.

Variety: Cappelle sown at 200 kg.

Cultivations, etc.: Deep-tine cultivated: 5 Oct, 1971. Seed sown: 28 Oct. N applied: 20 Apr, 1972. Weedkiller applied: 4 May. Harvested by hand: 24 Aug.

Standard errors per plot.

Grain, tonnes/hectare: Whole plot: 0.489 or 11.2% (22 d.f.)
Sub plot: 0.416 or 9.6% (24 d.f.)

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72/W/CS/77

TABLE OF MEANS

GRAIN: TONNES/HECTARE

T

	F1D	F2D	F4D	F6D	F2S	F4S	D2	D4	D2F2D	D2F4D	D4F2D	D4F4D	Mean
N: KG/HA													
63	3.50	3.86	3.54	3.90	3.67	4.27	4.26	4.58	4.48	3.93	3.83	4.72	4.05
126	4.62	4.98	4.90	4.15	4.23	4.48	4.63	4.78	4.91	4.27	4.65	5.37	4.66
Mean	4.06	4.42	4.22	4.02	3.95	4.37	4.44	4.68	4.69	4.10	4.24	5.05	4.35

STANDARD ERRORS OF DIFFERENCES

	T	N	T N
	0.399	0.098	0.466
Unless same levels of T			0.340

Mean D.M. %: 82.7

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72/W/CS/77

STRAW FRESH: TONNES/HECTARE

T

	F1D	F2D	F4D	F6D	F2S	F4S	D2	D4	D2F2D	D2F4D	D4F2D	F4F4D	Mean
N: KG/HA													
63	7.05	8.45	9.89	7.72	7.58	9.16	9.14	11.39	10.42	8.96	7.72	11.05	9.04
126	7.85	9.39	9.78	7.32	7.39	7.86	8.56	10.47	10.00	8.21	8.17	11.64	8.89
Mean	7.45	8.92	9.83	7.52	7.49	8.51	8.85	10.93	10.21	8.59	7.95	11.35	8.97

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72/W/CS/78

NEMATODES AND VERTICILLIUM

Object: To study the residual effects of methyl bromide, aldicarb and benomyl (applied to potatoes in 1971) on Heterodera rostochiensis and Verticillium on a second potato crop in 1972 - Woburn Broadmead I.

Sponsors: D.C.M. Corbett, G.A. Hide.

For first year see 71/W/CS/78(t).

The second year, potatoes.

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 (C): None (O), aldicarb at 6.7 kg (A), benomyl at 22.4 kg (B), aldicarb at 6.7 kg plus benomyl at 22.4 kg (A+B), dazomet at 336 kg (D), methyl bromide at 975 kg (M).

Basal applications: 1500 kg (13:13:20), 100 kg MgO as Epsom salts. Weedkiller: Chlorbromuron at 1.7 kg plus paraquat at 0.4 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

Seed: Pentland Dell.

Cultivations, etc.: Deep-tine cultivated: 16 Sept, 1971. NPK applied: 24 Mar, 1972. Mg applied: 17 Apr. Rotary cultivated twice, potatoes planted: 20 Apr. Weedkiller applied: 8 May. Fungicide applied: 6 July. Fungicide with insecticide applied: 27 July. Haulm mechanically destroyed: 24 Aug. Lifted: 12 Sept.

NOTE: Soil samples were taken after harvest for counts of numbers of cysts, eggs and larvae of Heterodera rostochiensis and propagules of Verticillium.

Standard error per plot.
Total tuber, tonnes/hectare: 3.53 or 21.6 % (15 d.f.)

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72/w/cs/78

TABLES OF MEANS

C

0	A	B	A+B	D	M	Mean
TOTAL TUBERS: TONNES/HECTARE						
4.7	20.9	20.9	25.5	9.9	16.1	16.3

STANDARD ERROR OF DIFFERENCES
C 2.49

% WARE: 4.44 CM (1.75 INCH) RIDDLE

10.2	63.7	70.2	72.1	26.5	49.5	48.7

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72/W/CS/79

CHEMICALS AND SCAB

Object: To study the residual effects of a range of fungicides (applied to potatoes in 1971) on yield and common scab on a second crop of potatoes in 1972 - Woburn School Field.

Sponsor: A.H. McIntosh.

The second year, potatoes.

For previous year see 71/W/CS/79(t).

Design: 5 blocks of 6 plots.

Whole plot dimensions: 2.84 x 6.10. Area harvested:0.00087.

Treatments: Residues of chemicals applied to potatoes 1971 (C): None (0), captafol 39 kg (C1), captafol 78 kg (C2), 'MC 2810' 78 kg a.i. (MC), pentachloropyridine 78 kg (P), quintozene 78 kg (Q).

Basal applications: 1510 kg (13:13:20). Weedkiller: Linuron at 1.1 kg in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

Variety: Maris Piper.

Cultivations, etc.: Ploughed: 24 Sept, 1971. Deep-tine cultivated: 15 Nov. NPK applied: 24 Mar, 1972. Rotary cultivated, potatoes planted: 21 Apr. Weedkiller applied: 11 May. Rotary ridged: 7 June. Fungicide applied: 6 July. Fungicide with insecticide applied: 28 July. Haulm mechanically destroyed: 14 Sept. Sprayed with undiluted BOV at 200 l: 22 Sept. Lifted: 2 Oct.

NOTE: Tuber samples were taken at harvest for scab assessments.

Standard error per plot.
Total tubers, tonnes/hectare: 6.44 or 14.4% (20 d.f.)

ERRATUM to 71/W/CS/79 p. 231
Area harvested should read: 0.00087.

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72/W/CS/79

TABLES OF MEANS

C

0	C1	C2	MC	P	Q	Mean
TOTAL TUBERS: TONNES/HECTARE						
48.2	50.0	46.2	50.4	31.6	41.5	44.7

STANDARD ERROR OF DIFFERENCES
C 4.07

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

96.6	96.2	95.8	96.9	96.8	95.2	96.2

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72/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 six years - Barnfield Section I Plot 3.

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

The second year, spring beans.

For previous year see 71/R/BE/1(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) (T):-

None	(O)
Fungicide, 70% dexon (powder) at 78.5 kg a.i.	(F)
Insecticide, BHC (emulsion) at 4.48 kg a.i.	(I)
Nematicide, 10% aldicarb (granules) at 11.2 kg a.i.	(N)
Biocide, formalin at 3000 l of a 38% solution of formaldehyde in 64000 l	(B)
Dexon, aldicarb and formalin together at rates shown above	(NBF)

Treatments F, I, N, B and NBF were rotary cultivated in, immediately after the final application. Treatment NBF received only treatments N and B in 1971.

Basal applications: Manures: PK Na Mg rates as on Barnfield Strip 4, Weedkillers: Paraquat at 0.56 kg ion in 220 l. Insecticide: Phorate at 1.12 kg applied as granules.

Seed: Maris Bead sown at 220 kg.

Cultivations, etc.: Paraquat applied: 10 Sept, 1971. Ploughed: 9 Dec. Formalin applied: 15 Dec. Remaining chemicals applied and rotary cultivated in: 17 Mar, 1972. Seed drilled: 22 Mar. Insecticide applied: 17 June. Harvested by hand: 20 Sept.

NOTE: Development of wilt was recorded during July and August. Crop samples were taken for root disease assessment. Counts were made of stem eelworm.

Standard error per plot.
Grain, tonnes/hectare: 0.429 or 12.0% (15 d.f.)

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72/R/CS/82

TABLES OF MEANS

GRAIN: TONNES/HECTARE

T

O	F	I	N	B	NBF	Mean
2.98	3.31	3.51	3.84	3.46	4.37	3.58

STANDARD ERROR OF DIFFERENCES
T 0.303

Mean D.M. %: 83.2

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72/R/CS/86

WEEDKILLER AND AQUEOUS N

Object: To study the effects of a range of rates of solid or liquid nitrogen 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 first year, old grass.

Design: 3 randomised blocks of 28 plots.

Whole plot dimensions: 2.74 x 1.37. Area harvested: 0.00022.

Treatments: (applied per cut): All combinations of:-

1. Weedkiller (dichlorprop/MCPA) (H): None (0), 1.4 (1), 2.8 (2), 4.2 (3) kg total a.e. (using fan jet size 00).
2. Forms of nitrogen: Solid, as 'Nitro-Chalk' 21% N applied immediately after the weedkiller, liquid, as urea/ammonium nitrate (26% N), mixed with the weedkiller (using fan jet size 00).
3. Nitrogen: 37.7, 75.3, 113.0 kg N,

together with 4 extra treatments (all liquid N3):-
H0, H1, H2, H3, where fan jet size 1 was used.

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 rates 1, 2 and 3 respectively.

Basal applications: 630 kg 0:14:28 broadcast.

Cultivations, etc.: Grass lightly trimmed, basal PK broadcast: 10 Mar, 1972. All treatments applied: 13 Apr. Cut: 8 June. All treatments re-applied: 28 June. Cut: 28 Sept.

NOTES: (1) Scores were made of foliar scorch by treatments on 18 Apr and 6 July.
(2) A score of the presence of weeds was made on 31 May.
(3) The % N in herbage was measured.
(4) The yield of weeds at the second cut was measured.

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

1st cut:	0.575	or 8.3% (54 d.f.)
2nd cut:	0.451	or 17.0% (54 d.f.)
Total of 2 cuts:	0.873	or 9.1% (54 d.f.)

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72/R/CS/86

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

	FORM		N:KG/HA			
	Solid	Liquid	37.7	75.3	113.0	Mean
H: KG/HA						
0	7.15	6.68	6.38	7.00	7.36	6.92
1.4	7.32	6.49	6.73	7.05	6.94	6.91
2.8	7.05	6.56	5.94	7.01	7.47	6.81
4.2	6.93	6.66	6.40	6.76	7.22	6.80
		Form				
		Solid	6.53	7.35	7.46	7.11
		Liquid	6.19	6.57	7.04	6.60
Mean			6.36	6.96	7.25	6.86

EXTRA (LIQUID N3)

H: KG/HA				
0	1.4	2.8	4.2	Mean
7.92	7.55	7.36	7.19	7.51

STANDARD ERRORS OF DIFFERENCES

H	FORM	N	H FORM	H N	FORM N	EXTRA
0.192	0.135	0.166	0.324	0.376	0.235	0.469

Grand Mean: 6.95
Mean D.M.%: 23.3

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72/R/CS/86

DRY MATTER: TONNES/HECTARE

2ND CUT

	FORM		N:KG/HA			
	Solid	Liquid	37.7	75.3	113.0	Mean
H: KG/HA						
0	2.89	2.54	2.14	2.65	3.35	2.72
1.4	3.16	2.27	2.27	2.73	3.15	2.72
2.8	2.77	2.52	2.29	2.58	3.08	2.65
4.2	2.55	2.25	2.00	2.37	2.83	2.40
		Form				
		Solid	2.43	2.68	3.42	2.85
		Liquid	1.91	2.48	2.79	2.39
Mean			2.17	2.58	3.10	2.62

EXTRA (LIQUID N3)

H: KG/HA				
0	1.4	2.8	4.2	Mean
3.53	2.68	2.92	2.36	2.88

STANDARD ERRORS OF DIFFERENCES

H	FORM	N	H FORM	H N	FORM N	EXTRA
0.150	0.106	0.130	0.254	0.296	0.184	0.369

Grand Mean: 2.66
Mean D.M. %: 31.0

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72/R/CS/86

DRY MATTER: TONNES/HECTARE

TOTAL OF 2 CUTS

	FORM		N:KG/HA			
	Solid	Liquid	37.7	75.3	113.0	Mean
H: KG/HA						
0	10.05	9.22	8.53	9.66	10.71	9.63
1.4	10.49	8.76	8.99	9.78	10.09	9.62
2.8	9.82	9.09	8.22	9.59	10.55	9.45
4.2	9.49	8.91	8.39	9.14	10.06	9.20
		Form				
		Solid	8.97	10.04	10.88	9.96
		Liquid	8.10	9.05	9.82	8.99
Mean			8.54	9.54	10.35	9.48

EXTRA(LIQUID N3)

H: KG/HA				
0	1.4	2.8	4.2	Mean
11.46	10.24	10.28	9.55	10.38

STANDARD ERRORS OF DIFFERENCES

H	FORM	N	H FORM	H N	FORM N	EXTRA
0.291	0.206	0.252	0.492	0.572	0.356	0.713

Grand Mean: 9.61
Mean D.M.%: 27.1

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72/R/CS/88 and 72/W/CS/88

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, Great Knott I (R) and Woburn, Warren Field I (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. FYM: None (0), Great Knott I (R): 53 tonnes, Warren Field I (W): 73 tonnes (D).
2. N and PK fertilisers (F) to give rates of nitrogen*: 188 (1), 377 (2), 565 (3) kg N as 'Nitro-Chalk'.
3. Times of applying PK: All in autumn (A), all in spring (S), half in autumn, half in spring (AS).

* The ratio of N:P2O5:K2O was 1:1.5:1.5 for all N treatments.

Basal applications:
Great Knott I (R): Weedkiller: Linuron at 0.84 kg with paraquat at 0.42 kg ion in 440 l. Fungicide: Mancozeb at 1.3 kg in 440 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 440 l.
Warren Field I (W): Ground chalk at 5 tonnes. Weedkiller: Linuron at 1.7 kg in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

Seed: Great Knott I (R): King Edward.
Warren Field I (W): Maris Piper.

Cultivations, etc.:-
Great Knott I (R): Autumn PK applied: 1 Nov, 1971. FYM applied: 4 - 5 Nov. Ploughed: 5 Nov. Spring PK applied: 24 Apr, 1972. N applied: 25 apr. Rotary cultivated, potatoes planted: 26 Apr. Weedkiller applied: 18 May. Grubbed, rotary ridged: 15 June.

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Fungicide applied on three occasions: 11 July, 24 July, 10 Aug. Insecticide applied with fungicide: 24 July. Sprayed with undiluted BOV at 200 l: 20 Sept. Haulm destroyed mechanically: 7 Oct. Lifted: 9 Oct. Previous crops: Barley 1970, fallow 1971.

Warren Field I (W): Chalk applied: 6 Sept, 1971. Autumn PK applied: 28 Oct. FYM applied, ploughed: 1 Nov. Spring PK and N applied: 5 Apr, 1972. Rotary cultivated twice, potatoes planted: 24 Apr. Weedkiller applied: 11 May. Rotary ridged: 20 June. Fungicide applied: 6 July. Fungicide with insecticide applied: 28 July. Sprayed with undiluted BOV at 200 l: 5 Oct. Lifted: 17 - 18 Oct. Previous crops: Wheat 1970, barley 1971.

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:
Great Knott I (R): 3.69 or 8.0% (34 d.f.)
Warren Field I (W): 2.31 or 4.7% (34 d.f.)

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72/R/CS/88 and 72/W/CS/88

TABLES OF MEANS

GREAT KNOTT I (R)

TOTAL TUBERS: TONNES/HECTARE

	F			TIME			
	1	2	3	A	S	AS	Mean
FYM							
O	38.6	45.9	47.6	41.7	45.1	45.2	44.0
D	44.0	48.0	51.0	45.4	48.6	49.0	47.7
			F				
			1	40.0	42.4	41.5	41.3
			2	44.1	48.4	48.3	47.0
			3	46.5	49.8	51.6	49.3
Mean				43.5	46.9	47.1	45.8

F	1			2			3		
TIME	A	S	AS	A	S	AS	A	S	AS
FYM									
O	36.7	39.8	39.2	42.4	47.6	47.6	46.1	47.8	48.8
D	43.3	45.0	43.9	45.9	49.3	49.0	47.0	51.7	54.3

STANDARD ERRORS OF DIFFERENCES

FYM	F	TIME	FYM F	FYM TIME	F TIME	FYM F TIME
1.00	1.23	1.23	1.74	1.74	2.13	3.01

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72/R/CS/88 and 72/W/CS/88

GREAT KNOTT I (R)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	F 1	F 2	F 3	TIME A	TIME S	TIME AS	Mean
FYM							
O	73.7	80.1	78.4	78.6	77.4	76.3	77.4
D	77.2	79.7	80.1	80.4	77.4	79.2	79.0
			F				
			1	77.5	74.2	74.6	75.4
			2	80.8	79.2	79.8	79.9
			3	80.3	78.7	78.8	79.3
Mean				79.5	77.4	77.8	78.2

F	1			2			3		
TIME	A	S	AS	A	S	AS	A	S	AS
FYM									
O	76.5	72.8	71.8	81.2	80.1	79.2	78.2	79.3	77.9
D	78.4	75.6	77.5	80.4	78.3	80.5	82.4	78.2	79.7

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72/R/CS/88 and 72/W/CS/88

WARREN FIELD I (W)

TOTAL TUBERS: TONNES/HECTARE

	F			TIME			
	1	2	3	A	S	AS	Mean
FYM							
0	39.1	47.9	54.5	46.4	47.9	47.2	47.2
D	45.8	52.9	55.1	50.1	51.2	52.5	51.3
			F				
			1	42.8	40.9	43.7	42.5
			2	48.5	51.7	51.0	50.4
			3	53.4	56.1	54.9	54.8
Mean				48.3	49.5	49.9	49.2

F	1			2			3		
TIME	A	S	AS	A	S	AS	A	S	AS
FYM									
0	40.1	37.6	39.6	45.3	49.5	48.9	53.9	56.5	53.1
D	45.5	44.1	47.8	51.8	53.8	53.1	52.9	55.6	56.7

STANDARD ERRORS OF DIFFERENCES

FYM	F	TIME	FYM F	FYM TIME	F TIME	FYM F TIME
0.63	0.77	0.77	1.09	1.09	1.34	1.89

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72/R/CS/88 and 72/W/CS/88

WARREN FIELD I (W)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	F			TIME			
	1	2	3	A	S	AS	Mean
FYM							
0	88.8	89.6	89.7	91.2	87.4	89.5	89.4
D	89.9	91.1	89.7	90.9	89.3	90.5	90.2
			F				
			1	91.6	86.0	90.4	89.4
			2	90.6	90.0	90.4	90.3
			3	90.8	89.0	89.4	89.7
Mean				91.0	88.3	90.0	89.8

F	1			2			3		
TIME	A	S	AS	A	S	AS	A	S	AS
FYM									
0	92.1	84.3	90.0	90.6	88.8	89.3	90.8	89.1	89.4
D	91.1	87.8	90.8	90.6	91.2	91.4	90.9	88.8	89.4

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72/W/CS/89

DAZOMET AND ORGANIC MATTER

Object: To study the effects and interactions of organic matter, inorganic fertilisers and dazomet on yield of potatoes and incidence of Heterodera rostochiensis - Woburn Long Mead.

Sponsor: A.G. Whitehead.

The first year, potatoes.

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 (T):
   - None (O)
   - Farmyard manure, 63.3 tonnes (12.6 tonnes D.M.) (D)
   - Peat, 36.2 tonnes (12.6 tonnes D.M.) + PK equivalent to that in farmyard manure (172 kg P2O5, 433 kg K2O) (P)
   - Fertiliser, PK equivalent to that in farmyard manure (172 kg P2O5, 433 kg K2O) (F)
2. Dazomet: 0, 340 kg. (DZ)

NOTE: It was intended to apply nitrogen, equivalent to that in farmyard manure to treatments (P) and (F). This application was omitted.

Basal applications: 1510 kg (13:13:20). Weedkiller: Chlorbromuron at 1.7 kg with paraquat at 0.24 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

Variety: Pentland Crown.

Cultivations, etc.: PK applied: 6 Oct, 1971. FYM, Peat applied, ploughed: 7-8 Oct. Dazomet applied, all plots rotary cultivated: 8 Dec. Ploughed: 29 Feb, 1972. Basal NPK applied: 30 Mar. Rotary cultivated, potatoes planted: 6 Apr. Weedkiller applied: 8 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 14 Sept. Lifted: 22 Sept. Previous crops: Potatoes 1970 and 1971.

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NOTE: Soil samples were taken in November 1971, before dazomet applied, and after lifting in September for cyst and egg counts of Heterodera rostochiensis.

Standard error per plot.
Total tubers, tonnes/hectare: 3.05 or 10.6% (14 d.f.)

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72/W/CS/89

TABLES OF MEANS

T

	O	D	P	F	Mean
	TOTAL TUBERS: TONNES/HECTARE				
DAZOMET: KG/HA					
0	18.3	21.4	19.4	20.6	19.9
340	37.1	36.7	36.5	40.4	37.7
Mean	27.7	29.0	28.0	30.5	28.8

STANDARD ERRORS OF DIFFERENCES

DAZOMET	T	DAZOMET T
1.24	1.76	2.49

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

DAZOMET: KG/HA					
0	85.3	92.3	87.9	90.3	88.9
340	94.1	94.8	94.7	95.6	94.8
Mean	89.7	93.5	91.3	92.9	91.9

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72/R/CS/90

CULTIVATIONS FOR CEREALS

Object: To study the engineering aspects - power requirements, rates of work, revenue and costs - of different tillage systems for wheat. Effects on weeds, soil pathogens and yield are also studied - Meadow.

Sponsors: D.E. Patterson (N.I.A.E.), J.R. Moffatt.

The first year, winter wheat.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 13.7 x 33.8. Area harvested: 0.01031.

Treatments: Tillage systems (TS):-

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): spiked rotary cultivated and drilled (3)

Two-pass system: Ploughed* 10 cm deep (4 inches): spiked rotary 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)

One-pass system: Tine cultivated 18 cm deep (7 inches) and rotary cultivated and drilled (7)

One-pass system: Tine cultivated 15 cm deep (6 inches) and rotary harrowed and drilled (8)

Two-pass system: Ploughed* 20 cm deep (8 inches): rotary harrowed and drilled (9)

Two-pass system: Cultivated by rotary digger* 22 cm deep (8.5 inches): spiked rotary cultivated and drilled (10)

All plots were disc drilled.

* Cultivations done on 14 Sept, 1971. All others done on 21/22 Oct.

Basal applications: 250 kg (10:24:24) combine drilled. 410 kg 'Nitro-Chalk' 25% N. Weedkiller: Paraquat at 0.56 kg ion in 220 l.

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72/R/CS/90

Seed: Joss Cambier sown at 180 kg.

Cultivations, etc.: Paraquat applied: 6 Oct, 1971. N applied: 21 Apr, 1972. Combine harvested: 25 Aug. Previous crops: Barley 1970 and 1971.

NOTE: Observations and determinations were made as follows:
1. Soil: Mechanical soil 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: Tiller counts, disease and weed assessments, grain size, aerial photographs.

Standard error per plot.
Grain, tonnes/hectare: 0.326 or 9.6% (18 d.f.)

TABLE OF MEANS

GRAIN: TONNES/HECTARE

TS

1	2	3	4	5	6	7	8	9	10	Mean
3.58	3.38	3.56	3.35	3.79	3.16	3.29	2.89	3.63	3.27	3.39

STANDARD ERROR OF DIFFERENCES
TS 0.266

Mean D.M. %: 85.0

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72/R/CS/93 and 72/W/CS/93

RATES OF NPK FERTILISER

Object: To study the effects of a range of rates of compound NPK fertiliser on yields of potatoes - Rothamsted (R) Delafield and Woburn (W) Great Hill III.

Sponsor: F.V. Widdowson.

The first year, potatoes.

Design: 4 blocks of 8 plots, split into 2.

Whole plot dimensions: Delafield: 4.27 x 16.1. Great Hill III: 4.27 x 21.0.
Area harvested: Delafield (R): 0.00108, Great Hill III (W): 0.00143.

Treatments:-
Whole plots: All combinations of:-
1. Rates of compound fertiliser (13:13:20): 1250, 1880, 2500, 3130 kg.
2. Spacing: Seed potatoes: 30 cm (12 inches), 45 cm (18 inches) apart within the row.

Sub plots:
3. Varieties:-
Delafield (R): King Edward (KE), Pentland Crown (PC).
Great Hill III (W): Pentland Crown (PC), Record (R).

NOTE: All rows were spaced 71 cm (28 inches) apart.

Basal applications:-
Delafield (R): Weedkiller: Linuron at 0.84 kg with paraquat at 0.42 kg ion 1440 l. Fungicide: Mancozeb at 1.3 kg in 440 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 440 l.
Great Hill III (W): Farmyard manure at 23 tonnes. Weedkiller: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

Cultivations, etc.:
Delafield (R): Ploughed: 12 - 15 Oct, 1971. NPK applied: 24 Apr, 1972. Rotary cultivated twice, potatoes planted: 25 Apr. Weedkiller applied: 17 May. Fungicide applied: 11 July, 25 July, 11 Aug. Insecticide with fungicide applied: 25 July. Sprayed with undiluted BCV at 200 l: 16 - 20 Sept. Haulm destroyed mechanically: 7 Oct. Lifted: 9 Oct. Previous crops: Barley 1970, fallow 1971.

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72/R/CS/93 and 72/W/CS/93

Great Hill III (W): Farmyard manure applied: 27 July - 6 Aug, 1971. Ploughed: 9 - 12 Aug. Re-ploughed: 6 - 9 Nov. NPK applied: 6 Apr, 1972. Rotary cultivated twice, potatoes planted: 21 Apr. Weedkiller applied: 11 May. Rotary ridged: 20 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 28 July. Sprayed with undiluted BOV at 200 l: 5 Oct. Lifted: 16 - 17 Oct. Previous crops: Barley 1970, grass 1971.

NOTES: (1) The percentage of N, P and K in the tubers, and K and Mg in the leaves were determined.
(2) Cooking tests were made on the ware potatoes.
(3) On Great Hill III Woburn the yields were adjusted for a linear trend along the blocks.

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

Delafield (R):	Whole plot:	2.33 or 4.3% (21 d.f.)
	Sub plot:	3.50 or 6.5% (24 d.f.)
Great Hill III (W):	Whole plot:	5.98 or 14.7% (20 d.f.)
	Sub plot:	3.99 or 9.8% (24 d.f.)

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72/R/CS/93 and 72/W/CS/93

TABLES OF MEANS

DELAFIELD (R)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1250	1880	2500	3130	Mean
	TOTAL TUBERS: TONNES/HECTARE				
SPACING: CM					
30	47.6	54.5	58.5	56.6	54.3
45	50.1	52.5	56.4	57.1	54.0
VARIETY					
KE	48.7	52.4	56.6	55.1	53.2
PC	49.0	54.7	58.4	58.7	55.2
Mean	48.9	53.5	57.5	56.9	54.2

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	F SPACING	F VARIETY	SPACING VARIETY	F SPACING VARIETY
1.16	0.82	0.87	1.65	1.70	1.20	2.40
Unless same levels of						
F				1.75		
S					1.24	
F.S						2.47

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

SPACING: CM					
30	70.6	76.8	79.0	78.6	76.2
45	80.3	83.0	83.5	81.5	82.1
VARIETY					
KE	69.2	73.9	74.4	72.6	72.5
PC	81.6	85.9	88.1	87.5	85.8
Mean	75.4	79.9	81.2	80.0	79.1

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72/R/CS/93 and 72/W/CS/93

GREAT HILL III (W)

COMPOUND FERTILISER (13:13:20) KG/HA (F)

	1250	1880	2500	3130	Mean
	TOTAL TUBERS: TONNES/HECTARE				
SPACING: CM					
30	34.4	39.7	46.2	47.3	41.9
45	31.1	41.0	41.1	44.5	39.4
VARIETY					
PC	37.2	44.9	47.5	49.3	44.7
R	28.3	35.8	39.8	42.4	36.6
Mean	32.7	40.3	43.7	45.9	40.7

STANDARD ERRORS OF DIFFERENCES

F	SPACING	VARIETY	F SPACING	F VARIETY	SPACING VARIETY	F SPACING VARIETY
3.01	2.13	1.00	4.26	3.30	2.34	4.67

Unless same levels of

F				2.00		
S					1.41	
F.S						2.82

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

SPACING: CM					
30	70.0	76.9	83.0	85.5	78.8
45	73.6	82.0	85.4	87.8	82.2
VARIETY					
PC	83.3	87.5	91.0	91.1	88.2
R	60.3	71.3	77.5	82.1	72.8
Mean	71.8	79.4	84.2	86.6	80.5

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72/R/CS/95

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 free of seed borne viruses and a site isolated from other bean crops (see also 72/R/BE/3) - West Barnfield I.

Sponsors: A.J. Cockbain, R. Bardner, G.A. Salt.

The first year, spring beans.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 6.40 x 19.2. Area harvested: 0.00615.

Treatments (T): None (O)
Aldicarb nematicide at 4.5 kg applied in granules (A)
Gamma BHC insecticide at 2.2 kg in 2220 l (B)
Dexon fungicide at 79 kg in 4440 l (DE)
Dieldrin insecticide at 2.2 kg in 2220 l (DI)
One plot per block was reserved without treatment (R)
Treatments applied and all plots rotary cultivated: 24 Mar, 1972.

Basal applications: Ground chalk at 7.5 tonnes. 400 kg (0:14:28) placement drilled. Weedkillers: Paraquat at 0.42 kg ion in 220 l. Simazine at 0.84 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 440 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.: Chalk applied: 3 Sept, 1971. Paraquat applied: 24 Sept. Ploughed: 13 Nov. Seed placement drilled: 25 Mar, 1972. Simazine applied: 2 May. Demeton-s-methyl applied: 24 June. Combine harvested: 25 Sept. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Incidence of viruses was assessed on 3 occasions. Infestations by weevils, aphids and stem eelworm were also assessed.

Standard error per plot.
Grain, tonnes/hectare: 0.179 or 4.8% (23 d.f.)

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72/R/CS/95

TABLES OF MEANS

GRAIN: TONNES/HECTARE

T

O*	A	B	DE	DI	Mean
3.58	3.59	3.70	3.90	3.92	3.71

STANDARD ERRORS OF DIFFERENCES

T

Between any of A, B, DE or DI 0.127
O v any of A, B, DE or DI 0.110

Mean D.M. %: 80.6

* Duplicated treatment

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72/W/CS/99

EFFECT OF BREAKS ON TAKE-ALL

Object: To study the phenomenon of 'take-all' (Gaeumannomyces graminis, formerly Ophiobolus graminis) decline in barley - Woburn Butt Furlong.

Sponsor: D. Hornby.

The first year, barley. Crop sequences 1 and 4 - 9.

Design: 2 blocks of 9 plots.

Whole plot dimensions: 5.33 x 15.2. Area harvested: 0.00429.

Treatments:-

Whole plots: Crop sequences (CS):-

	1968-71	1972	1973	1974	1975	1976	1977	1978
1	B	B	B	B	B	B	B	B
2	B	F	B	B	B	B	B	B
3	B	F	Be	B	B	B	B	B
4	B	B	F	Be	B	B	B	B
5	B	B	B	F	Be	B	B	B
6	B	B	B	B	F	Be	B	B
7	B	B	B	B	B	F	Be	B
8	B	B	B	B	B	B	F	Be
9	B	B	B	B	B	B	B	F

B = Barley, BE = Spring beans, F = Fallow.

Basal applications:- 7.5 tonnes magnesian limestone, 500 kg (20:15:15) combine drilled. Weedkiller: Paraquat at 0.56 kg ion in 280 l, Ioxynil, bromoxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 280 l.)

Seed: Julia (seed dressed with ethirimol) sown at 160 kg.

Cultivations, etc.: Paraquat applied: 10 Sept, 1971. Ploughed: 27 Sept. Magnesian limestone applied: 4 Nov. Deep-tine cultivated: 5 Nov. Seed combine drilled: 15 Mar, 1972. 'Tetroxone' applied to barley plots: 3 May. Paraquat applied to fallow plots: 7 June. Combine harvested: 11 Aug.

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.
Grain, tonnes/hectare: 0.493 or 12.4% (6 d.f.)

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72/W/CS/99

TABLE OF MEANS

GRAIN: TONNES/HECTARE

CS

1	4	5	6	7	8	9	Mean
3.62	4.52	4.10	3.37	3.86	4.49	3.88	3.98

STANDARD ERROR OF DIFFERENCES
CS 0.493

Mean D.M. %: 87.2

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72/W/CS/101

GRASS, EFFECTS OF NEMATODES

Object: To study the effects of aldicarb and disulfoton on yield of old grass and incidence of insects and nematodes - Woburn Bull Field.

Sponsor: D.L. Trudgill.

The first year, old grass.

Design: 5 blocks of 4 plots.

Whole plot dimensions: 2.74 x 6.40. Area harvested: 0.00059.

Treatments:-
Chemicals (C): None (0), aldicarb, 22 kg in spring (A), disulfoton, 4.5 kg in spring plus 2.2 kg 3 months later (D), aldicarb and disulfoton at the above rates and times (AD).

Basal applications: 630 kg (0:14:28), 500 kg (25:0:16) in spring and 300 kg (25:0:16) after each cut.

Cultivations, etc.: Grass topped, PK and NK applied, chain harrowed: 29 Feb, 1972. Aldicarb and disulfoton applied: 3 Mar. Disulfoton applied: 10 June. Cut twice: 16 June, 11 Aug. NK applied: 27 June, 16 Aug. Previous crop: Permanent grass.

NOTE: Nematode counts were made after each cut.

Standard errors per plot. Dry matter, tonnes/hectare:
1st cut: 0.907 or 14.4% (12 d.f.)
2nd cut: 0.268 or 12.2% (12 d.f.)
Total of 2 cuts: 0.829 or 9.8% (12 d.f.)

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72/W/CS/101

TABLES OF MEANS

DRY MATTER: TONNES/HECTARE

1ST CUT

C

O	A	D	A+D	Mean
6.20	6.05	5.77	7.09	6.28

STANDARD ERROR OF DIFFERENCES
C 0.574

2ND CUT

C

O	A	D	A+D	Mean
2.23	2.37	1.93	2.27	2.20

STANDARD ERROR OF DIFFERENCES
C 0.169

TOTAL OF 2 CUTS

C

O	A	D	A+D	Mean
8.43	8.42	7.70	9.36	8.48

STANDARD ERROR OF DIFFERENCES
C 0.524

Mean D.M. %: 1st cut: 21.5
2nd cut: 21.9
Total of 2 cuts: 21.7

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72/R/CS/102

NEMATICIDES AND DITYLENCHUS

Object: To study the effects of three nematicides at three rates on yields of onions and incidence of Ditylenchus dipsaci - Great Field II.

Sponsor: A.G. Whitehead.

The first year, onions.

Design: 3 blocks of 9 plots, randomisation restricted, plus one nil plot per block.

Whole plot dimensions: 1.52 x 6.10. Area harvested: 0.00056.

Treatments:
None (0) and:-

Nematicides	Rates in kg a.i.
Aldicarb (A)	1.57 (1), 3.14 (2), 6.27 (4)
CGA10576 (C)	1.12 (1), 2.24 (2), 4.48 (4)
Du Pont 1410 (D)	1.46 (1), 2.92 (2), 5.83 (4)

Nematicides were applied in the rows at sowing.

Basal applications: 1880 kg (13:13:20). Weedkillers: Propachlor ('Ramrod' at 6.7 kg). Methazole ('Paxilon' at 2.8 kg).

Seed: Robusta, dressed dieldrin.

Cultivations, etc.: Ploughed: 23 - 27 Sept, 1971. NPK applied: 13 Mar, 1972. Treatments applied, seed drilled, propachlor applied: 21 Apr. Methazole applied: 26 June. Hand weeded: 6 July. Lifted: 29 Sept. Previous crops: Barley 1970, spring beans 1971.

NOTES: (1) Soil samples were taken before treatments were applied and after harvest for counts of Ditylenchus dipsaci.
(2) Onions were stored during the winter for observation of incidence of rots.

Standard error per plot.
Weight, tonnes/hectare: 3.42 or 9.0% (18 d.f.)

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72/R/CS/102

TABLES OF MEANS

WEIGHT OF SOUND ONIONS: TONNES/HECTARE

	RATE 1	2	4	Mean
NEMATICIDE				
A	42.3	39.2	39.3	40.3
C	31.6	41.7	34.3	35.9
D	39.2	41.6	40.4	40.4
Mean	37.7	40.8	38.0	38.8

0 31.8

Grand mean: 38.1

STANDARD ERRORS OF DIFFERENCES

NEMATICIDE	RATE	NEMATICIDE RATE & 0
1.61	1.61	2.79

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72/W/CS/103

SIMAZINE RATES AND SOIL TYPES

Object: To study the effects of simazine and other weedkillers on weed control and yield in beans grown on heavy and light soils containing different amounts of organic matter - Woburn, Warren Field II, White Horse, Great Hill Bottom I.

Sponsors: J.R. Moffatt, A.E. Johnston, G.G. Briggs.

The first year, spring beans.

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: 0.00390.
Great Hill Bottom I: 4.26 x 9.14. Area harvested: 0.00293.

Treatments: No weed control (O), mechanical cultivation (M), chlorpropham with diuron, applied the day after sowing (DCE) together with All combinations of:-

1. Weedkiller (W): Simazine (S), simazine with trietazine in proportions 1:7 (ST).
2. Rates of weedkiller: 50% below normal rate for soil type (1), normal rate (2), 50% above normal rate (3).
3. Times of application: Early, day after sowing (E), late, up to 14 days after sowing (L).

Rates and times used on each field:-
Warren Field II (heavy soil, much organic matter).
Chlorpropham with diuron ('New Residuren' at 5.6 l in 450 l) simazine and simazine with trietazine at 0.56, 1.12, 1.68 kg in 450 l.
Early = day after sowing, Late = 10 days after sowing.
White Horse (light soil, much organic matter).
Chlorpropham with diuron ('New Residuren' at 4.2 l in 450 l), simazine and simazine with trietazine at 0.42, 0.84, 1.26 kg in 450 l.
Early = day after sowing, Late = 10 days after sowing.
Great Hill Bottom I (light soil, little organic matter).
Chlorpropham with diuron ('New Residuren' at 4.2 l in 450 l), simazine and simazine with trietazine at 0.42, 0.84, 1.26 kg in 450 l.
Early = day after sowing, Late = 37 days after sowing.

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Basal applications: All fields: 400 kg (0:14:28). Insecticide: Phorate at 1.1 kg.
White Horse: 7.5 tonnes magnesian limestone.
Warren Field II and White Horse: Weedkiller: Paraquat at 0.56 kg ion in 280 l.

Seed: Maris Bead sown at 220 kg.

Cultivations, etc.:
Warren Field II: Paraquat applied: 9 Sept, 1971. Deep-tine cultivated three times: 4 - 5 Nov, 5 - 15 Nov, 15 - 16 Nov. PK placed, seed drilled: 20 Mar, 1972. E plots sprayed: 21 Mar. L plots sprayed: 30 Mar. M plots harrowed: 9 May. M plots mechanically hoed three times: 9 May, 15 May, 31 May, Insecticide applied: 13 June. Combine harvested: 21 Sept. Previous crops: Winter wheat 1970, spring beans 1971.
White Horse: Magnesian limestone applied: 4 Sept, 1971. Paraquat applied: 9 Sept. Ploughed: 13 Oct. Deep-tine cultivated: 10 Nov. PK placed, seed drilled: 20 Mar, 1972. E plots sprayed: 21 Mar. L plots sprayed: 30 Mar. M plots harrowed: 9 May. M plots mechanically hoed twice: 10 May, 31 May. Volunteer potatoes pulled: 31 May - 5 June. Insecticide applied: 6 June. Combine harvested: 3 Oct. Previous crops: Potatoes 1970, winter wheat 1971.
Great Hill Bottom I: Ploughed: 5 Nov, 1971. PK placed, seed drilled: 20 Mar, 1972. E plots sprayed: 21 Mar. L plots sprayed: 26 Apr. M plots harrowed: 9 May. M plots mechanically hoed twice: 10 May, 31 May. Insecticide applied: 13 June. Combine harvested: 29 Sept. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Soil samples were taken in spring to determine organic matter content at depths 0 - 7.6 cm and 7.6 - 15.0 cm to determine the movement of the active ingredient of the weedkillers down the soil profile.

Standard errors per plot. Grain, tonnes/hectare.
Warren Field II (R): 0.299 or 13.2% (42 d.f.)
White Horse (R): 0.410 or 13.5% (41 d.f.)
Great Hill Bottom I (W): 0.413 or 13.8% (27 d.f.)

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72/W/CS/103

TABLES OF MEANS

GRAIN: TONNES/HECTARE

WARREN FIELD II (W)

	RATE			TIME		
	1	2	3	E	L	Mean
W						
S	2.30	2.51	2.23	2.19	2.51	2.35
ST	2.26	2.30	2.26	2.24	2.31	2.27
		RATE				
		1		2.17	2.39	2.28
		2		2.28	2.53	2.41
		3		2.18	2.31	2.25
Mean				2.21	2.41	2.31

EXTRA		
0	M	DCE
1.91	2.12	2.25

Grand mean: 2.27

STANDARD ERRORS OF DIFFERENCES

W	RATE	TIME	EXTRA	W RATE	W TIME	RATE TIME
0.086	0.106	0.086	0.212	0.150	0.122	0.150

Mean D.M. %: 74.6

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72/W/CS/103

GRAIN: TONNES/HECTARE

WHITE HORSE (W)

	RATE 1	RATE 2	RATE 3	TIME E	TIME L	Mean
W						
S	3.06	2.96	3.16	3.13	2.98	3.06
ST	2.90	3.14	2.98	2.98	3.03	3.01
		RATE				
		1		2.92	3.04	2.98
		2		3.07	3.04	3.05
		3		3.19	2.95	3.07
Mean				3.06	3.01	3.03

EXTRA O	EXTRA M	EXTRA DCE
3.43	2.69	3.06

Grand mean: 3.04

STANDARD ERRORS OF DIFFERENCES

W	RATE	TIME	EXTRA	W RATE	W TIME	RATE TIME
0.118	0.145	0.118	0.290	0.205	0.236	0.290

Mean D.M. %: 81.3

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72/W/CS/103

GRAIN: TONNES/HECTARE

GREAT HILL BOTTOM I (W)

	RATE 1	RATE 2	RATE 3	TIME E	TIME L	Mean
W						
S	2.88	3.34	2.97	3.01	3.12	3.06
ST	2.86	3.04	2.72	3.07	2.67	2.87
		RATE				
		1		2.92	2.82	2.87
		2		3.23	3.15	3.19
		3		2.98	2.71	2.84
Mean				3.04	2.89	2.97

EXTRA 0	EXTRA M	EXTRA DCE
2.98	3.11	3.05

Grand mean: 2.98

STANDARD ERRORS OF DIFFERENCES

W	RATE	TIME	EXTRA	W RATE	W TIME	RATE TIME
0.138	0.169	0.138	0.337	0.238	0.275	0.337

Mean D.M. %: 82.2

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72/s/cs/1

ROW SPACING AND SEED RATES AFTER INTENSIVE WHEAT

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 seventh year on this site, second 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 and 71/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: 0.00312.

Treatments: Cumulative on 1971 treatments.
Additional plots: Two immediately previous continuous winter wheat crops (Year 2), row spacing 189 mm (8.25 inches) and seed rate 212 kg (S), and N to sub-plots as shown below, and all combinations of:-

Whole plots:
1. Cropping history: 3, 4, 5 and 6 years of immediately previous winter wheat crops 1966 - 1971 (3, 4, 5, 6).

Half plots:
2. Row spacing: 152 mm (6 inches), 304 mm (12 inches).
3. Seed rates: 70.6, 141, 212, 283 kg.

One third plots:
4. N rates: 50, 100, 150 kg N as 'Nitro-Chalk'.

Basal applications: 1260 kg (0:20:20) applied to stubble in autumn before plo ghing. 310 kg (20:10:10) broadcast at drilling.
Weedkiller: Terbutryne and related triazines ('Prebane' at 4.5 kg).

Seed: Cappelle.

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72/S/CS/1

Cultivations, etc.: Basal PK applied and ploughed in: 2 Oct, 1971. Seed drilled and basal NPK applied: 26 Oct. Weedkiller applied: 27 Oct. Test N applied: 21 Apr, 1972. Combine harvested: 29 Aug.

Addendum to 71/S/CS/1: Basal applications should include 310 kg (20:10:10) broadcast at drilling.

NOTE: Green crop samples for estimates of total dry matter and leaf areas were taken.

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72/S/CS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

Year

	3	4	5	6	Mean
SPACING: MM					
152	5.82	5.80	5.92	5.90	5.86
304	5.93	5.88	5.86	5.85	5.88
SEED RATE: KG					
70.6	5.95	5.71	5.85	5.82	5.83
141	5.96	5.96	5.98	5.93	5.96
212	5.82	5.98	5.96	5.98	5.93
283	5.77	5.71	5.76	5.77	5.75
N: KG/HA					
50	5.38	5.35	5.13	5.17	5.26
100	6.07	6.16	6.16	6.25	6.16
150	6.17	6.01	6.37	6.21	6.19
Mean	5.87	5.84	5.89	5.87	5.87

YEAR 2

N: KG/HA

50	100	150	Mean
4.31	4.83	5.87	5.34

Grand mean: 5.76
Mean D.M. %: 84.8

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72/R/WW/1 and 72/W/WW/1

WINTER WHEAT

VARIETIES AND N

Object: To study the yield of newer varieties of wheat grown at a range of nitrogen levels, on land in rotation or after several cereals. Nitrogen applied at flowering is also tested, and bread-making quality is determined. Rothamsted (R) Whittlocks (pathogen free) and Claycroft (pathogen infected) and Woburn (W) Great Hill II (pathogen free).

Sponsors: J.R. Moffatt, R. Moffitt.

Design: 3 randomised blocks of 8 plots, split into 4.

Whole plot dimensions: 4.27 x 27.1. Sub plot area harvested: 0.00173.

Treatments: All combinations of:-
Whole plots: 1. Varieties: Champlein (CH), Cama (CM), Cappelle (CP), Joss Cambier (JC), Maris Huntsman (MH), Maris Nimrod (MN), Maris Widgeon (MW), Tommy (TO).
Sub plots: 2. Levels of nitrogen (in kg N): 63, 126, 189 in spring, and 126 in spring plus 63 at flowering. All N as 'Nitro-Chalk'.

Basal applications:
Manures: Claycroft (R) and Whittlocks (R): 300 kg (0:20:20). Great Hill II (W): 290 kg (0:20:20).
Weedkillers: Paraquat at 0.56 kg ion in 220 l to Claycroft (R) only. 2,4-D at 0.7 kg plus dichlorprop at 2.8 kg in 220 l (280 l on Great Hill II (W)) to Claycroft (R) and Great Hill II (W). MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l) to Whittlocks (R).
Seed: Varieties sown at 200 kg on Claycroft (R) and Whittlocks (R) and at 180 kg on Great Hill II (W).

Cultivations, etc.:
Claycroft (R): Paraquat applied: 28 Sept, 1971. Deep-tine cultivated on 3 occasions: 12, 22 and 25 Oct. Seed combine drilled: 27 Oct. N applied: 5 Apr, 1972. Weedkiller applied: 26 Apr. Late N applied: 15 June. Combine harvested: 30 Aug. Previous crops: Winter wheat 1970 and 1971.

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72/R/WW/1 and 72/W/WW/1

Whittlocks (R): Deep-tine cultivated on 2 occasions: 25 and 26 Oct, 1971. Seed combine drilled: 28 Oct. N applied: 5 Apr, 1972. Weedkiller applied: 27 Apr. Late N applied: 15 June. Combine harvested: 30 Aug. Previous crops: Fallow 1970, potatoes 1971.

Great Hill II (W): Deep-tine cultivated on 2 occasions: 8 and 9 Oct, 1971. Seed combine drilled: 22 Oct. N applied: 17 Apr, 1972. Weedkiller applied: 27 Apr. Late N applied: 19 June. Combine harvested: 30 Aug. Previous crops: Fallow 1970, potatoes 1971.

Standard errors per plot. Grain, tonnes/hectare:

Whittlocks (R):	Whole plot:	0.398 or 6.0% (14 d.f.)
	Sub plot:	0.740 or 11.1% (48 d.f.)
Claycroft (R):	Whole plot:	0.449 or 7.3% (14 d.f.)
	Sub plot:	0.433 or 7.0% (44 d.f.)
Great Hill II (W):	Whole plot:	0.449 or 10.9% (14 d.f.)
	Sub plot:	0.444 or 10.8% (48 d.f.)

NOTE: On Claycroft (R) four plots of one block were damaged by cattle and yields were not taken. Estimated values were used in the analysis. The treatment combinations affected were:-

Variety	N
TO	126
CH	63
CM	63
MN	63

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72/R/WW/1 and 72/W/WW/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

N: KG/HA	VARIETY CH	CM	CP	JC	MH	MN	MW	TO	Mean
	WHITTLOCKS (R) PATHOGEN FREE								
63	7.27	6.24	6.21	5.81	6.74	7.44	5.92	6.35	6.50
126	6.12	6.82	6.19	4.67	8.40	8.41	6.40	7.23	6.78
189	6.31	4.80	6.08	4.14	8.22	7.49	6.89	5.84	6.22
126+63	7.60	6.19	7.63	4.71	8.37	8.33	6.98	6.88	7.09
Mean	6.82	6.01	6.53	4.83	7.93	7.91	6.55	6.58	6.65

STANDARD ERRORS OF DIFFERENCES

VARIETY	NITROGEN	VARIETY NITROGEN
0.325	0.214	0.616
Unless same levels of VARIETY		0.604

Mean D.M. %: 84.1

CLAYCROFT (R) PATHOGEN INFECTED

N: KG/HA									
63	5.62	5.24	5.28	5.35	6.06	6.80	5.55	5.71	5.70
126	6.56	5.68	5.91	5.58	7.11	7.02	6.20	6.60	6.33
189	6.13	5.71	5.54	4.80	7.32	7.52	6.36	5.89	6.16
126+63	7.09	5.59	5.86	5.49	7.81	7.70	6.03	6.50	6.51
Mean	6.35	5.56	5.65	5.30	7.07	7.26	6.03	6.17	6.17

STANDARD ERRORS OF DIFFERENCES

VARIETY	NITROGEN	VARIETY NITROGEN
0.366	0.125	0.477
Unless same levels of VARIETY		0.355

Mean D.M. %: 85.4

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72/R/WW/1 and 72/W/WW/1

GRAIN: TONNES/HECTARE

GREAT HILL II (W) PATHOGEN FREE

	VARIETY								
	CH	CM	CP	JC	MH	MN	MW	TO	Mean
N: KG/HA									
63	4.16	3.62	4.85	3.66	4.33	4.65	4.06	4.15	4.19
126	4.75	3.10	4.99	3.69	4.55	4.42	4.69	4.02	4.28
189	5.07	2.73	3.84	2.96	3.54	4.61	3.90	3.22	3.73
126+63	5.25	3.38	4.62	3.36	4.62	4.70	4.51	3.58	4.25
Mean	4.81	3.21	4.57	3.42	4.26	4.59	4.29	3.74	4.11

STANDARD ERRORS OF DIFFERENCES

VARIETY	NITROGEN	VARIETY NITROGEN
0.367	0.128	0.483
Unless same levels of VARIETY		0.363

Mean D.M. %: 85.8

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72/R/WW/2

WINTER WHEAT

WEEDKILLER AND AQUEOUS N

Object: To study the effects of a range of rates of solid or liquid nitrogen in combination with a range of rates of hormone weedkiller on foliar scorch and yield of winter wheat - Whittlocks.

Sponsors: S.C.R. Freeman, A. Perry.

Design: 3 randomised blocks of 28 plots.

Whole plot dimensions: 2.13 x 2.74. Area harvested: 0.00038.

Treatments: All combinations of:-

1. Weedkiller (dichlorprop/MCPA) (H): None (0), 1.4 (1), 2.8 (2), 4.2 (3) kg total a.e.
2. Forms of nitrogen: Solid, as 'Nitro-Chalk' (21% N) applied immediately after the weedkillers, liquid, as urea/ammonium nitrate (26% N) mixed with the weedkiller (L).
3. Nitrogen: 37.7, 75.3, 113.0 kg N, together with 4 extra treatments:
   SN2 E H0, SN2 E H1, SN2 E H2, SN2 E H3 (N2 = 75.3 kg N)
   where 'Nitro-Chalk' was applied early (E) and the H0 plots were hand weeded.

Basal applications: 280 kg (0:20:20) combine drilled.

Seed: Joss Cambier dressed dieldrin, sown at 200 kg.

Cultivations, etc.: Deep-tine cultivated twice: 28 Oct, 1971. Seed combine drilled: 29 Oct. N applied to E plots: 17 Apr, 1972. Remaining N treatments and weedkiller applied: 2 May. H0 plots hand weeded: 30 June. Cut by sickle: 29 Aug. Previous crops: Fallow 1970, potatoes 1971.

NOTE: Grain and straw samples were taken for determination of dry matter and samples retained for N analyses.

Standard error per plot.
Grain, tonnes/hectare: 0.403 or 7.3% (54 d.f.)

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72/R/WW/2

TABLES OF MEANS

GRAIN: TONNES/HECTARE

H: KG/HA

	0	1.4	2.8	4.2	Mean
FORM					
S	5.45	5.70	5.44	5.54	5.53
L	5.32	5.70	5.54	5.26	5.46
N: KG/HA					
37.7	5.24	5.26	5.18	5.24	5.23
75.3	5.43	6.11	5.73	5.39	5.67
113.0	5.50	5.72	5.56	5.57	5.59
Mean	5.39	5.70	5.49	5.40	5.49

N: KG/HA

	37.7	75.3	113.0
FORM			
S	5.39	5.72	5.49
L	5.07	5.61	5.68

EXTRA (SN2 E)

H: KG/HA

0	5.28
1.4	5.47
2.8	6.20
4.2	5.84

STANDARD ERROR OF DIFFERENCES

H	FORM	N	H FORM	H N	EXTRA
0.134	0.095	0.116	0.227	0.264	0.329

Grand mean: 5.52

Mean D.M. %: 83.8

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72/B/WW/2

STRAW: TONNES/HECTARE

H: KG/HA

	0	1.4	2.8	4.2	Mean
FORM					
S	8.32	8.19	8.16	8.06	8.18
L	7.89	7.93	7.80	7.34	7.74
N: KG/HA					
37.7	7.66	7.45	6.83	7.01	7.24
75.3	7.84	8.48	8.17	7.58	8.02
113.0	8.80	8.25	8.93	8.52	8.63
Mean	8.10	8.06	7.98	7.70	7.96

N: KG/HA

	37.7	75.3	113.0
FORM			
S	7.34	8.27	8.92
L	7.13	7.76	8.33

EXTRA (SN2 E)
H:KG/HA

0	8.68
1.4	8.58
2.8	8.63
4.2	8.60

Grand mean: 8.05

Mean D.M. %: 69.0

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72/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 - Whittlocks.

Sponsors: S.C.R. Freeman, A. Penny.

Design: 4 randomised blocks of 21 plots.

Whole plot dimensions: 2.13 x 2.74. Area harvested: 0.00264.

Treatments: All combinations of:-

1. Forms of nitrogen: Solid as 'Nitro-Chalk' (S) (21% N) applied immediately after weedkiller and fungicide, liquid as urea/ammonium nitrate (26% N) mixed with the weedkiller and fungicide where appropriate.
2. Nitrogen: 56.5, 113 kg N.
3. Weedkiller (dichlorprop/MCPA) (H): None, 2.8 kg total a.e.
4. Fungicide (F): None (O), tridemorph at 0.53 kg (T)

together with 5 extra treatments:-

SN1E H TO, SN2E H TO, SN1E H TE, SN2E H TE, SN2 H TL,
(N1 = 56.5, N2 = 113.0 kg N, H = H at 2.8 kg)

where 'Nitro-Chalk' and tridemorph were applied early (E), and tridemorph was applied late (L).

Basal applications: 280 kg (0:20:20) combine drilled.

Seed: Joss Cambier dressed dieldrin, sown at 200 kg.

Cultivations, etc.: Deep-tine cultivated twice: 28 Oct, 1971. Seed combine drilled: 29 Oct. N and tridemorph applied to E plots: 17 Apr, 1972. Remaining N and tridemorph treatments and weedkiller applied: 11 May. Cut by sickle: 30 Aug. Previous crops: Fallow 1970, potatoes 1971.

NOTE: Estimates were made of infection by mildew (Erysiphe graminis). Grain samples were taken for determinations of dry matter and % N.

Standard error per plot.
Grain, tonnes/hectare: 0.375 or 6.9% (60 d.f.)

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72/R/WW/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N: KG/HA		H: KG/HA		F: KG/HA		
	56.5	113.0	0	2.8	0	0.53	Mean
FORM							
Solid	5.56	5.30	5.41	5.45	5.39	5.47	5.43
Liquid	5.30	5.22	5.19	5.34	5.42	5.11	5.26
N: KG/HA							
56.5			5.36	5.51	5.52	5.35	5.43
113.0			5.24	5.27	5.29	5.23	5.26
H: KG/HA							
0					5.32	5.28	5.30
2.8					5.49	5.30	5.39
Mean					5.40	5.29	5.35

EXTRA

SN1E H T0	SN2 H T0	SN1E H TE	SN2 H TE	SN2 H TL
5.79	5.54	5.86	5.30	5.45

STANDARD ERRORS OF DIFFERENCES

ALL MARGINAL MEANS	ALL 2-FACTOR TABLES	EXTRA
0.094	0.133	0.265

Grand mean: 5.40

Mean D.M. %: 84.9

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72/R/WW/3

STRAW (FRESH): TONNES/HECTARE

	N: KG/HA		H: KG/HA		F: KG/HA		
	56.5	113.0	0	2.8	00	0.53	Mean
FORM							
Solid	9.81	9.40	9.87	9.34	9.54	9.67	9.60
Liquid	9.27	9.27	9.63	8.91	9.49	9.06	9.27
N: KG/HA							
56.5			9.94	9.15	9.50	9.58	9.54
113.0			9.56	9.11	9.53	9.14	9.34
H: KG/HA							
0					9.82	9.69	9.75
2.8					9.21	9.04	9.13
Mean					9.51	9.36	9.44

EXTRA

SN1E H TO	SN2 H TO	SN1E H TE	SN2E H TE	SN2 H TL
10.89	10.61	11.08	11.17	9.29

Grand mean: 9.72

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72/R/WW/4

WINTER WHEAT

EWSM SPREAD BY INFECTED VECTORS

Object: To study the effects of introducing vectors (Javesella pellucida), carrying european wheat striate mosaic, at different times, on spread of disease and yield of wheat - Long Hoos IV.

Sponsor: R.T. Plumb.

Design: 2 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 12.2. Area harvested: 0.00347.

Treatments: Caging of plant-hopper vectors (Javesella pellucida) carrying EWSM on central area (0.61 x 1.22) of plot for 2 weeks (DATE):-

No vectors	(O)
Vectors caged on 23 December, 1971	(D)
On 20 January, 1972	(J)
On 5 April	(A)
On 8 May	(M)

The central area (0.61 x 1.22) was cut out before plot yields were taken.

Basal applications: 250 kg (10:24:24) combine drilled. 105 kg N as 'Nitro-Chalk'. Weedkiller: Dicamba, mecoprop and MCPA ('Tetralex Plus' at 7 l in 220 l).

Seed: Cappelle sown at 200 kg.

Cultivations, etc.: Ploughed: 6 Oct, 1971. Seed combine drilled: 23 Oct. N applied: 24 Apr, 1972. Weedkiller applied: 26 Apr. Combine harvested: 31 Aug. Previous crops: Potatoes 1970, barley 1971.

NOTE: Scores for EWSM were made and plants were sampled throughout the season.

Standard error per plot.
Grain, tonnes/hectare: 0.149 or 2.0% (4 d.f.)

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72/R/WW/4

TABLE OF MEANS

GRAIN: TONNES/HECTARE

DATE

O	D	J	A	M	Mean
7.36	7.35	7.38	7.11	7.31	7.30

STANDARD ERROR OF DIFFERENCES
DATE 0.149

Mean D.M. %: 85.0

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72/R/WW/6 and 72/BB/WW/6

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 72/R&BB/B/1) - Rothamsted (R), Long Hoos I and II and Broom's Barn (BB), Hackthorn 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 47.8. Sub plot area harvested: 0.00434.
Hackthorn Field (BB): 15.2 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-
Whole plots: 1. Irrigation (I): None (O), full irrigation (C).
Sub plots: 2. Nitrogen: 31, 63, 94, 125, 157, 188 kg N as 'Nitro-Chalk'.
Total irrigation was 86.4 mm, applied on 4 occasions (R) and 126 mm, on 5 occasions (BB).

Basal applications (both fields):
1260 kg (0:20:20) plus 900 kg Epsom salts in seedbed. 250 kg (10:24:24) combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 280 l.

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

Cultivations, etc.:
Long Hoos I and II (R): Basal PK and Epsom salts applied: 24 Sept, 1971. Ploughed: 5 Oct. Seed combine drilled: 25 Oct. N applied: 19 Apr, 1972. Weedkiller applied: 26 Apr. Fungicide applied: 12 May. Irrigated: 2, 13 and 29 June and 14 July. Combine harvested: 31 Aug. Previous crops: Spring wheat 1970, spring beans 1971.

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72/R/WW/6 and 72/BB/WW/6

Hackthorn Field (BB): Deep-tine cultivated: 23 Sept, 1971. Epsom salts applied: 12 Oct. Basal PK applied: 15 Oct. Seed combine drilled: 25 Oct. Weedkiller applied: 17 Apr. N applied: 19 Apr, 1972. Fungicide applied: 16 May. Irrigated: 2, 13, 29 and 30 June and 18 July. Combine harvested: 24 Aug. Previous crops: Sugar beet 1970, beans 1971.

Standard errors per sub plot. Grain, tonnes/hectare:
Long Hoos I and II (R): 0.272 or 3.6% (20 d.f.)
Hackthorn Field (BB): 0.432 or 7.0% (20 d.f.)

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72/R/WW/6 and 72/BB/WW/6

TABLES OF MEANS

LONG HDOS I & II (R)

N: KG/HA

	31	63	97	125	157	188	Mean
I	GRAIN: TONNES/HECTARE						
O	8.04	8.24	7.86	7.68	7.50	6.25	7.59
C	7.84	7.99	8.02	7.59	7.48	6.72	7.61
Mean	7.94	8.11	7.94	7.64	7.49	6.48	7.60

STANDARD ERRORS OF DIFFERENCES

N	I* N
0.157	0.222

* Within the same level of I

I	STRAW: TONNES/HECTARE						
O	6.90	7.09	7.53	7.92	8.62	8.35	7.74
C	6.37	7.77	7.82	8.56	8.72	8.57	7.97
Mean	6.63	7.43	7.68	8.24	8.67	8.46	7.85

Mean D.M. %: Grain: 80.9
Straw: 80.9

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72/R/WW/6 and 72/BB/WW/6

HACKTHORN FIELD (BB)

N: KG/HA

I	31	63	94	125	157	188	Mean
	GRAIN: TONNES/HECTARE						
O	5.46	6.05	6.37	5.89	6.06	5.85	5.94
C	6.09	6.67	6.71	6.64	6.48	6.14	6.45
Mean	5.77	6.36	6.54	6.26	6.27	5.99	6.20

STANDARD ERRORS OF DIFFERENCES

N	I* N
0.250	0.353

* Within the same level of I

I							
	STRAW: TONNES/HECTARE						
O	6.53	7.20	7.63	7.23	7.89	7.56	7.34
C	6.18	7.16	7.42	7.66	7.88	7.64	7.32
Mean	6.35	7.18	7.52	7.45	7.88	7.60	7.33

Mean D.M. %: Grain: 85.2
Straw: 60.0

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72/R/WW/7

WINTER WHEAT

METHODS OF APPLYING FUNGICIDES

Object: To study the effects of fungicides, applied to seed or soil, on yields and pathogens of wheat - West Barnfield II.

Sponsors: J. Jenkyn, R.D. Prew.

Design: 3 randomised blocks of 5 plots.

Whole plot dimensions: 2.13 x 13.4. Area harvested: 0.00195.

Treatments: Fungicide (F)

None		(0)
Seed dressings:	Organo-mercury fungicide at 425 g of the commercial formulation	(M)
	NF48 at 2.28 kg a.i.	(N)
Soil drench after sowing:		
	Sandoz fungicide at 11.1 l in 5600 l	(S1)
	and at 16.6 l in 5600 l	(S2)

Basal applications: 250 kg (10:24:24) combine drilled, and 600 kg 'Nitro-Chalk' in spring. Weedkillers: Paraquat at 0.42 kg ion in 220 l. MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).

Seed: Cama (undressed apart from treatments M and N) sown at 190 kg.

Cultivations, etc.: Paraquat applied: 24 Sept, 1971. Ploughed: 9 Oct. Seed combine drilled: 28 Oct. Soil drench applied: 30 Oct. N applied: 24 Apr, 1972. 'Banlene Plus' applied: 28 Apr. Combine harvested: 26 Aug. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Seedling emergence counts were made in January, and samples taken for root diseases in April and July. Mildew (Erysiphe graminis) was assessed in May, June and July, and yellow rust (Puccinia striiformis) in June and July.

Standard error per plot.
Grain, tonnes/hectare: 0.426 or 11.1% (8 d.f.)

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72/R/WW/7

TABLE OF MEANS

GRAIN: TONNES/HECTARE

F

0	M	N	SL	S2	Mean
4.25	3.80	3.64	3.75	3.83	3.85

STANDARD ERROR OF DIFFERENCES
F 0.348

Mean D.M. %: 85.8

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72/R/WW/8

WINTER WHEAT

VARIETIES, SOWING DATES AND BULB FLY

Object: To study the growth, yield and incidence of wheat bulb fly (Leptohylemyia coarctata) in four varieties of wheat sown on two occasions - Stackyard.

Sponsor: R. Bardner.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 2.13 x 9.14. Area harvested: 0.00195.

Treatments: All combinations of:-
1. Varieties: Cappelle (CA), Joss Cambier (JC), Maris Ranger (MR), Maris Widgeon (MW).
2. Sowing dates: Early (12 Oct, 1971) (E), late (6 Dec, 1971) (L).

Basal applications: 270 kg (10:24:24) combine drilled, 500 kg 'Nitro-Chalk'. Weedkiller: Ioxynil at 0.63 kg and mecoprop at 1.89 kg in 220 l.

Seed: Dressed with fungicide only and sown at 200 kg.

Cultivations, etc.: Deep-tine cultivated: 11 Oct, 1971. N applied: 20 Apr, 1972. Weedkiller applied: 28 Apr. Combine harvested: 30 Aug. Previous crops: Winter wheat 1970, fallow 1971.

NOTE: Larval counts were taken throughout the growing season. Pupal counts were made from soil cores at the end of the season. Individual plants were marked in spring and examined before harvest to determine the relationship between larval attacks and plant growth. Emergence cages were used to determine the number of wheat bulb flies. 1000 grain weights were taken.

Standard error per plot.
Grain, tonnes/hectare: 0.503 or 9.1% (21 d.f.)

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72/R/WW/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VARIETY

	CA	JC	MR	MW	Mean
DATE					
E	7.63	6.31	7.46	7.39	7.20
L	3.90	2.95	4.39	4.23	3.87
Mean	5.77	4.63	5.93	5.81	5.53

STANDARD ERRORS OF DIFFERENCES

VARIETY	DATE	VARIETY DATE
0.251	0.178	0.355

Mean D.M. %: 82.1

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72/R/WW/12

WINTER WHEAT

EFFECTS OF BLUE-GREEN ALGAE

Object: To study the establishment of blue-green algae in relation to culture type, method of application, irrigation and nitrogen fertiliser. Effects on yield of wheat are also tested - Great Field II.

Sponsor: P.J. Dart.

Design: A single replicate of 5 x 3 x 2 x 2 in 60 plots.

Whole plot dimensions: 2.13 x 4.57. Area harvested: 0.00081.

Treatments: All combinations of:-

1. Type of algal culture* (C):
   - None (0)
   - Nostoc ellipsosporium (isolated from Broadbalk Field) (1)
   - Nostoc punctiforum (isolated from Broadbalk Field) (2)
   - Anabaena cylindrica (3)
   - A mixture of the three species (4)
2. Irrigation (I): None (0), 50 mm (2 inches) during the first week in July (1), soil surface kept continually moist (2).
3. Method of application of algal inoculum* (M): In water as a spray (1), as a dry sand crust broadcast by hand (2).
4. N levels: 0, 50 kg as 'Nitro-Chalk'.

* Rates of application of inoculum were as follows:

		(in g/ha of dry weight of algae)
Spray inoculum:	C1:	920
	C2:	920
	C3:	420
	C4:	670
Dry sand inoculum: (estimated weights)	C1:	450
	C2:	830
	C3:	260
	C4:	830

Basal applications: 280 kg (0:20:20) combine drilled.

Seed: Maris Ranger sown at 200 kg.

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Cultivations, etc.: Ploughed: 23 Sept, 1971. Seed combine drilled: 6 Oct. N and water cultures applied: 9 May, 1972. Sand cultures applied: 15 May. Combine harvested: 31 Aug. Previous crops: Barley 1970 beans 1971.

NOTE: Estimates were made of the extent of algal cover and species involved and of recovery of inoculum types. N fixation was measured by acetylene reduction assay.

Standard error per plot (estimated from 4 factor interaction). Grain, tonnes/hectare: 0.543 or 8.2% (8 d.f.)

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72/R/WW/12

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	I			M		N: KG/HA		
	0	1	2	1	2	0	50	Mean
C								
0	6.23	6.60	6.92	6.70	6.47	5.70	7.47	6.58
1	7.07	6.48	6.76	6.75	6.78	6.00	7.54	6.77
2	6.47	6.37	6.44	6.67	6.18	5.38	7.47	6.42
3	6.74	6.59	6.73	6.72	6.65	5.64	7.74	6.69
4	6.77	6.46	6.45	6.61	6.52	5.76	7.36	6.56
		I						
		0		6.77	6.54	5.80	7.51	6.66
		1		6.60	6.40	5.54	7.46	6.50
		2		6.69	6.63	5.75	7.57	6.66
				M				
				1		5.79	7.59	6.69
				2		5.60	7.44	6.52
Mean						5.70	7.51	6.61

STANDARD ERRORS OF DIFFERENCES

C	I	M	N	C I	C M	I M	C N	I N	M N
0.222	0.172	0.140	0.140	0.384	0.314	0.243	0.314	0.243	0.198

Mean D.M. %: 85.8

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72/R/WS/2

SPRING WHEAT

EFFECTS OF GAPS

Object: To study the effects of different amounts and types of gapping on yield of spring wheat - Fosters Corner.

Sponsor: R. Bardner.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00130.

Treatments (T):
Gaps produced by sowing dead seed (killed by heat) mixed with live seed to give a total seed rate of 190 kg. Amount of live seed sown:-
47.5 kg (1+3)
95.0 kg (2+2)
143.0 kg (3+1)
190.0 kg (4)
Gaps produced by removal of a quarter of the plants, as evenly spaced 15 cm gaps, one month after sowing at normal seed rate:-
190.0 kg (4G)
Gaps produced by sowing live seed at half normal seed rate:-
95.0 kg (2).

Basal applications: 630 kg (0:14:28). 380 kg 'Nitro-Chalk' combine drilled.

Seed: Kolibri.

Cultivations, etc.: Deep-tine cultivated twice: 12 Nov, 1971. Basal PK applied: 21 Mar, 1972. Seed combine drilled: 23 Mar. Combine harvested: 5 Sept. Previous crops: Fallow 1970, potatoes 1971.

NOTES: (1) Estimates were made of the number of ear-bearing stalks. 1000 grain weights were taken.
(2) The yields from three plots (T2+2, T3+1, and T4G) had to be discarded. Estimated values were used in the analysis.

Standard error per plot.
Grain, tonnes/hectare: 0.239 or 5.1% (12 d.f.)

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72/R/WS/2

TABLES OF MEANS

GRAIN: TONNES/HECTARE

T

1+3	2+2	3+1	4	4G	2	Mean
4.19	4.83	4.66	4.90	4.60	4.70	4.65

STANDARD ERROR OF DIFFERENCES
T 0.169

Mean D.M. %: 80.0

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72/R/WS/3

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 - Fosters Corner.

Sponsor: G.N. Thorne.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 2.41 x 13.7. Area harvested: 0.00094.

Treatments: All combinations of:-
1. Nitrogen: 0, 25, 50, 75, 100, 125, 150, 175, 200 kg N as 'Nitro-Chalk'.
2. Seed rates: 84, 179 kg.

Basal applications: 630 kg (0:14:28). Weedkiller: Bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 340 l). Fungicides: Tridemorph at 0.53 kg in 340 l on 4 occasions and oxycarboxin ('Plantvax 75' at 2.0 kg in 340 l) on one occasion.

Seed: Kleiber.

Cultivations, etc.:- Deep-tine cultivated twice: 12 Nov, 1971. Basal PK applied: 21 Mar, 1972. Seed drilled: 23 Mar. Test N applied: 1 May. Weedkiller applied: 17 May. Fungicides applied: tridemorph: 23 May, 2 June, 14 June, 26 June, oxycarboxin: 6 July. Combine harvested: 6 Sept. Previous crops: Fallow 1970, potatoes 1971.

NOTE: Plant counts were made after germination and shoot counts throughout the season. Plant samples were taken on 8 occasions for growth analysis. Soil moisture was measured on 4 occasions and light penetration on 3. Rates of photosynthesis of leaves were measured on 8 occasions and translocation on 3. Scores were made for mildew (Erysiphe graminis), % anthesis and yellowness at ripening.

Standard error per plot.
Grain, tonnes/hectare: 0.665 or 12.6% (17 d.f.)

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72/R/WS/3

TABLE OF MEANS

GRAIN: TONNES/HECTARE

N: KG/HA

	0	25	50	75	100	125	150	175	200	Mean
SEED RATE: KG/HA										
84	4.49	5.14	5.23	5.88	5.45	5.82	5.58	5.04	5.32	5.33
179	4.05	5.05	4.52	4.90	5.41	5.73	5.80	5.74	5.74	5.21
Mean	4.27	5.10	4.88	5.39	5.43	5.77	5.69	5.39	5.53	5.27

STANDARD ERROR OF DIFFERENCES

N	SEED RATE	N SEED RATE
0.471	0.222	0.665

Mean D.M. %: 78.4

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72/R/WS/4

SPRING WHEAT

DWARF VARIETIES, N AND CCC

Object: To study the effects of CCC (chlormequat) and a range of nitrogen levels on four semi-dwarf spring wheat varieties - Fosters Corner.

Sponsor: S.A.W. French.

Design: A single replicate of 4 x 4 x 4 in 4 blocks of 4 whole plots split into 4 sub plots, with split plot confounding of 3 factor interaction with blocks.

Whole plot dimensions: 2.16 x 29.6. Sub plot area harvested: 0.00080.

Treatments: All combinations of:-
Whole plots: 1. Varieties: Charles Peguy* (CP), Tobari (TO), 6WUK3 (W3), 6WUK4(W4).
* Formerly Benoist 257.
Sub plots: 2. N levels: 75, 150, 225, 300 kg as 'Nitro-Chalk'.
3. CCC: None, 1.1, 2.2, 3.3 kg in 340 l.

Basal applications: 630 kg (0:14:28). Weedkiller: Bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 340 l).

Seed: Sown at 190 kg.

Cultivations, etc.: Deep-tine cultivated twice: 12 Nov, 1971. Basal PK applied: 21 Mar, 1972. Seed drilled: 23 Mar. Weedkiller applied: 17 May. N applied: 1 May. CCC applied: 1 June. Combine harvested: 7 Sept. Previous crops: Fallow 1970, potatoes 1971.

NOTE: Plant counts were made shortly after germination, shoot counts in early June, and ear counts at ear emergence. Crop height was measured at harvest.

Standard errors per plot.
Grain, tonnes/hectare: Whole plot: 0.193 or 4.4% (6 d.f.)
Sub plot: 0.276 or 6.3% (18 d.f.)

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72/R/WS/4

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N: KG/HA				CCC: KG/HA				
	75	150	225	300	0.0	1.1	2.2	3.3	Mean
VARIETY									
CP	5.61	5.47	5.12	4.93	5.52	5.19	5.04	5.37	5.28
TO	4.58	4.89	4.93	4.96	4.85	4.57	5.06	4.88	4.84
W3	2.33	2.41	2.72	2.66	2.35	2.51	2.70	2.58	2.53
W4	4.12	4.75	4.92	5.11	4.72	4.82	4.84	4.51	4.72
	N: KG/HA								
			75		4.17	4.06	4.18	4.23	4.16
			150		4.41	4.33	4.54	4.23	4.38
			225		4.53	4.17	4.44	4.55	4.42
			300		4.33	4.53	4.47	4.34	4.42
Mean					4.36	4.27	4.41	4.34	4.34

Mean D.M. %: 84.2

STANDARD ERRORS OF DIFFERENCES

	VARIETY	N	CCC	VARIETY N	VARIETY CCC	N CCC
	0.137	0.097	0.097	0.217	0.217	0.195
Unless same level of VARIETY				0.195	0.195	

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72/R/B/1 and 72/BB/B/1

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 72/R & BB/WW/6) - Rothamsted (R), Pastures and Broom's Barn (BB), Windbreak Field.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: 3 randomised blocks of 2 plots, split into 6.

Whole plot dimensions:
Pastures (R): 15.2 x 48.0. Sub plot area harvested: 0.00434.
Windbreak Field (BB): 36.6 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-
Whole plots: 1. Irrigation (I): None (O), full irrigation (C).
Sub plots: 2. Nitrogen: 31, 63, 94, 125, 157, 188 kg N as 'Nitro-Chalk'.
Total irrigation was 68.6 mm applied on 3 occasions (R) and 81.0 mm applied on 4 occasions (BB).

Basal applications:
Manures (both fields): 1260 kg (0:20:20) plus 900 kg Epsom salts ploughed in in autumn, 360 kg (0:20:20) combine drilled.
Weedkillers:
Pastures (R): Paraquat at 0.56 kg ion in 220 l. MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l).
Windbreak Field (BB): MCPA, mecoprop and dicamba ('Banlene Plus' at 4.2 l) plus mecoprop at 1.4 l in 220 l.

Seed: Julia dressed with ethirimol sown at 160 kg.

Cultivations, etc.:
Pastures (R): Paraquat applied: 2 Oct, 1972. Basal PK and Epsom salts applied, plots ploughed: 19 Nov. N applied: 17 Mar, 1972. Seed combine drilled: 18 Mar. 'Banlene Plus' applied: 18 May. Irrigated: 13 June, 16 June, 6 July. Combine harvested: 23 Aug. Previous crops: Spring beans 1970, barley 1971.

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72/R/B/1 and 72/BB/B/1

Windbreak Field (BB): Basal PK applied: 6 Sept, 1971. Epsom salts applied: 15 Sept. Ploughed: 1 Oct. N applied: 16 Mar, 1972. Seed combine drilled: 17 Mar. Weedkiller applied: 16 May. Irrigated: 2 June, 13 June, 29 June, 30 June. Combine harvested: 11 Aug. Previous crops: Wheat 1970 and 1971.

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 plot. Grain, tonnes/hectare:
Pastures (R): Sub plot: 0.320 or 4.9% (20 d.f.)
Windbreak Field (BB): Sub plot: 0.414 or 7.5% (20 d.f.)

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72/R/B/1 and 72/BB/B/1

TABLES OF MEANS

PASTURES (R)

N: KG/HA

I	31	63	94	125	157	188	Mean
	GRAIN: TONNES/HECTARE						
0	6.54	6.84	6.95	6.64	6.79	6.49	6.71
C	6.38	6.79	6.60	6.29	5.79	5.86	6.29
Mean	6.46	6.82	6.77	6.47	6.29	6.18	6.50

STANDARD ERRORS OF DIFFERENCES

N	I* N
0.185	0.261

I							
	STRAW: TONNES/HECTARE						
0	5.11	5.73	6.56	6.72	6.50	7.21	6.31
C	5.13	6.51	6.50	7.03	7.09	7.30	6.60
Mean	5.12	6.12	6.53	6.88	6.80	7.25	6.45

Mean D.M. %: Grain: 84.6
Straw: 86.6

* Within the same level of I only.

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72/R/B/1 and 72/BB/B/1

WINDBREAK FIELD (BB)

N: KG/HA

I	31	63	94	125	157	188	Mean
			GRAIN: TONNES/HECTARE				
0	4.55	5.13	5.76	5.96	6.19	6.19	5.63
C	4.76	6.10	5.82	5.88	5.24	5.11	5.48
Mean	4.65	5.61	5.79	5.92	5.71	5.65	5.56

STANDARD ERRORS OF DIFFERENCES

N	I* N
0.239	0.338

I							
			STRAW: TONNES/HECTARE				
0	3.66	5.00	4.80	5.76	5.09	5.73	5.01
C	4.55	5.41	6.83	6.48	6.90	6.03	6.03
Mean	4.10	5.21	5.82	6.12	6.00	5.88	5.52

Mean D.M. %: Grain: 85.1
Straw: 57.3

* Within the same level of I only.

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72/R/B/2 and 72/W/B/2

BARLEY

VARIETIES AND N

Object: To study the yield of newer varieties of barley grown at a range of nitrogen levels - Rothamsted (R) Pastures and Woburn (W) Lansome III.

Sponsor: J.R. Moffatt.

Design: 4 randomised blocks of 6 plots, split into 3.

Whole plot dimensions: 4.27 x 24.7. Sub plot area harvested: 0.00217.

Treatments: All combinations of:-
Whole plots: 1. Varieties: Berac (BE), Gerkra (GE), Hassan (HA), Julia (JU), Mazurka (MA), Vada (VA).
Sub plots: 2. Levels of nitrogen: 38, 75, 113 kg N as 'Nitro-Chalk'.

Basal applications:
Pastures (R): 310 kg (0:20:20) combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 225 l on 2 occasions. Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).
Lansome III (W): 250 kg (0:20:20) combine drilled. Weedkiller: Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 280 l).

Seed: Gerkra dressed with organomercury and ethirimol, remainder with dual purpose and ethirimol. Sown at 160 kg (R), 150 kg (W).

Cultivations, etc.:-
Pastures (R): Paraquat applied: 2 and 6 Oct, 1971. Ploughed: 18 Nov. Seed combine drilled: 17 Mar, 1972. N applied: 7 - 13 Apr. 'Tetroxone' applied: 8 May. Combine harvested: 22 Aug. Previous crops: Spring beans 1970, barley 1971.
Lansome III (W): Ploughed: 27 Sept, 1971. Deep-tine cultivated: 10 Nov. Seed combine drilled: 16 Mar, 1972. N applied: 17 Mar. 'Tetroxone' applied: 8 May. Combine harvested: 14 Aug. Previous crops: Spring beans 1970, barley 1971.

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Standard errors per plot. Grain, tonnes/hectare:

Pastures (R):	Whole plot:	0.248 or 3.9% (15 d.f.)
	Sub plot:	1.050 or 16.5% (36 d.f.)
Lansome III (W):	Whole plot:	0.285 or 5.7% (15 d.f.)
	Sub plot:	0.679 or 13.6% (36 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

PASTURES (R)

N: KG/HA

	38	75	113	Mean
VARIETY				
BE	6.80	7.04	6.29	6.71
GE	5.72	6.04	5.26	5.67
HA	7.80	6.63	6.23	6.89
JU	6.57	7.51	6.69	6.92
MA	6.63	5.70	5.12	5.82
VA	7.31	5.59	5.36	6.09
Mean	6.81	6.42	5.83	6.35

STANDARD ERRORS OF DIFFERENCES

VARIETY	N	VARIETY N
0.176	0.303	0.631
Unless same levels of VARIETY		0.743

Mean D.M. %: 85.2

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72/R/B/2 and 72/W/B/2

GRAIN: TONNES/HECTARE

LANSOME III (W)

N: KG/HA

	38	75	113	Mean
VARIETY				
BE	4.15	5.40	5.65	5.07
GE	4.10	5.26	5.45	4.94
HA	3.45	5.62	5.50	4.86
JU	3.80	5.29	6.08	5.06
MA	3.43	5.24	5.85	4.84
VA	4.12	5.25	5.89	5.09
Mean	3.84	5.34	5.74	4.97

STANDARD ERRORS OF DIFFERENCES

	VARIETY	N	VARIETY N
	0.202	0.196	0.441
Unless same levels of VARIETY			0.480

Mean D.M. %: 85.8

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72/R/B/3

BARLEY

WEEDKILLER AND AQUEOUS N

Object: To study the effects of a range of rates of solid or liquid nitrogen in combination with a range of rates of hormone weedkiller on foliar scorch and yield of barley - Pastures.

Sponsors: S.C.R. Freeman, A. Penny.

Design: 3 randomised blocks of 28 plots.

Whole plot dimensions: 2.13 x 2.74. Area harvested: 0.00038.

Treatments: All combinations of:-
1. Weedkiller (dichlorprop/MCPA) (H): 0 (0), 1.4 (1), 2.8 (2), 4.2 (3) kg total a.e.
2. Forms of nitrogen: Solid as 'Nitro-Chalk' (21% N) applied immediately after the weedkiller (S), liquid as urea/ammonium nitrate (26% N) mixed with the weedkiller (L).
3. Nitrogen: 37.7, 75.3, 113 kg N,

together with 4 extra treatments:
SN2 E H0, SN2 E H1, SN2 E H2, SN2 E H3 (N2 = 75.3)
where 'Nitro-Chalk' was applied early (E) and the H0 plots were hand weeded.

Basal applications: 190 kg (10:24:24) combine drilled. Weedkiller: Paraquat at 0.56 kg ion in 225 l.

Seed: Julia dressed ethirimol, sown at 160 kg.

Cultivations, etc.: Paraquat applied: 2 Oct, 1971. Ploughed: 23 Nov. Seed combine drilled: 20 Mar, 1972. N applied to E plots: 3 May. Remaining N treatments and weedkiller applied: 18 May. H0 plots hand weeded: 30 June. Cut by sickle: 17 Aug. Previous crops: Beans 1970, barley 1971,

NOTE: Grain and straw samples were taken for determination of dry matter and % N.

Standard error per plot.
Grain, tonnes/hectare: 0.334 or 5.1% (54 d.f.)

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72/R/B/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	FORM		N: KG/HA			
	S	L	37.7	75.3	113	Mean
H: KG/HA						
0	6.49	6.45	6.40	6.59	6.41	6.47
1.4	6.66	6.79	6.48	6.64	7.05	6.72
2.8	6.58	6.52	6.48	6.48	6.71	6.55
4.2	6.53	6.44	6.18	6.48	6.80	6.49
		FORM				
		S	6.46	6.72	6.52	6.57
		L	6.31	6.37	6.97	6.55
Mean			6.39	6.55	6.74	6.56

Extra (SN2 E)

	H: KG/HA				
	0	1.4	2.8	4.2	Mean
	6.38	6.44	6.58	6.39	6.45

STANDARD ERRORS OF DIFFERENCES

H	FORM	N	H FORM	H N	FORM N
0.111	0.079	0.096	0.188	0.219	0.136

EXTRA

H

0.273

Grand Mean: 6.54
Mean D.M. %: 77.2

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72/R/B/3

STRAW: TONNES/HECTARE

	FORM		N: KG/HA			
	S	L	37.7	75.3	113	Mean
H: KG/HA						
0	6.73	6.31	5.90	6.58	7.08	6.52
1.4	6.50	6.38	6.09	6.26	6.96	6.44
2.8	6.47	6.43	5.84	6.25	7.25	6.45
4.2	6.36	6.20	5.60	6.30	6.94	6.28
		FORM				
		S	5.92	6.64	6.98	6.51
		L	5.79	6.06	7.13	6.33
Mean			5.86	6.35	7.06	6.42

Extra (SN2 E9)

H: KG/HA				
0	1.4	2.8	4.2	Mean
6.37	6.38	6.48	6.52	6.44

Grand Mean: 6.42
Mean D.M. %: 52.1

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72/R/B/4

BARLEY

TIMES OF APPLYING FUNGICIDES

Object: To compare specified stages of crop growth with spore trapping data as a means of determining the optimum time to apply a spray of mildewicide to barley - Pastures.

Sponsor: A. Bainbridge.

Design: 6 x 6 Latin square.

Whole plot dimensions: 4.27 x 9.15. Area harvested: 0.00195.

Treatments (T):-

None	(O)
Seed dressed with ethirimol	(DE)
Sprayed with tridemorph at 0.53 kg in 390 l	
at G.S.5 (leaf sheaths strongly erected) on 22 May	(S1)
at G.S.8 (last leaf just visible) on 14 June	(S2)
at G.S.10 (ear emergence) on 22 June	(S3)
and after the first peak spore catch (on 2 June)	(S4)

Basal applications: 440 kg (20:15:15) combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seed: Zephyr sown at 160 kg.

Cultivations, etc.: Paraquat applied: 2 Oct, 1971. Ploughed: 18 Nov. Seed combine drilled: 23 Mar, 1972. 'Tetroxone' applied: 8 May. Combine harvested: 22 Aug. Previous crops: Beans 1970, barley 1971.

NOTE: Counts were made of seedling emergence and fertile tillers. Measurements of crop height were made. Thousand grain weights were taken, and foliar diseases were assessed weekly during the season.

Standard error per plot.
Grain, tonnes/hectare: 0.382 or 6.7% (20 d.f.)

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72/R/B/4

TABLE OF MEANS

GRAIN: TONNES/HECTARE

T

O	DE	S1	S2	S3	S4	Mean
5.13	5.53	5.89	5.86	5.63	6.00	5.67

STANDARD ERRORS OF DIFFERENCES
T 0.220

Mean D.M. %: 84.4

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72/R/B/5

BARLEY

CONTROL OF CEREAL APHIDS AND BYDV

Object: To study the effects of controlling cereal aphids on the incidence of barley yellow dwarf virus and yield of barley - Whittlocks.

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: 0, 2.5, 5.0 kg.
2. Menazon, spray, in late May (M): None (0), menazon ('Saphi-Col' at 0.7 l in 370 l) applied on 1 June (S).
3. Menazon in late June (J): None (0), menazon ('Saphi-Col' at 0.7 l in 440 l) applied on 30 June (S).

Basal applications: 440 kg (20:15:15) combine drilled. Weedkiller: Bromoxynil, ioxynil, dichlorprop and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seed: Julia sown at 160 kg.

Cultivations, etc.: Deep-tine cultivated: 9 Nov, 1971. Phorate applied: 25 Mar. Seed combine drilled: 29 Mar, 1972, Weedkiller applied: 8 May. Combine harvested: 24 Aug. Previous crops: Potatoes 1970, fallow 1971.

NOTE: Counts of plants with virus symptoms and of numbers and species of aphids were made on four occasions. Estimates of mildew infection (Erysiphe graminis) were made on two occasions. All plots were badly lodged at harvest.

Standard error per plot.
Grain, tonnes/hectare: 0.219 or 3.4% (33 d.f.)

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72/R/B/5

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	M		J		
	O	S	O	S	Mean
PHORATE: KG/HA					
0	6.36	6.56	6.41	6.51	6.46
2.5	6.58	6.51	6.48	6.61	6.55
5.0	6.59	6.53	6.47	6.66	6.56
M					
O			6.44	6.58	6.51
S			6.47	6.60	6.53
Mean			6.45	6.59	6.52

M	O		S	
J	O	S	O	S
PHORATE: KG/HA				
0	6.26	6.46	6.56	6.55
2.5	6.52	6.64	6.44	6.59
5.0	6.54	6.65	6.40	6.67

STANDARD ERRORS OF DIFFERENCES

PHORATE	M	J	PHORATE M	PHORATE J	M J	PHORATE M J
0.078	0.063	0.063	0.110	0.110	0.090	0.155

Mean D.M. %: 85.2

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72/R/B/6

BARLEY

EARLY AND LATE MILDEW

Object: To study the effects of applying ethirimol as seed dressing and spray at different times, on incidence of mildew (Erysiphe graminis) and yield of barley - Whittlocks.

Sponsor: J.Jenkyn.

Design: 8 randomised blocks of 4 plots.

Whole plot dimensions: 4.27 x 24.4. Area harvested: 0.00390.

Treatments: Fungicide, ethirimol (F):-

None	(0)
0.22 kg as seed dressing	(E)
1.79 kg as seed dressing plus 2 spray applications each at 0.90 kg in 340 l	(EL)
2 spray applications each at 0.90 kg in 340 l	(L)

NOTE: Mildew infected seedlings were planted in 0 and L plots.

Basal applications: 440 kg (20:15:15) combine drilled. Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seed: Zephyr (all dressed with normal dual purpose dressing) sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated: 9 Nov, 1971. Seed combine drilled: 23 Mar, 1972. Mildew infected seedlings planted in 0 and L plots: 25 Apr. Weedkiller applied: 8 May. Ethirimol sprays applied: 23 June, 13 July. Combine harvested: 22 Aug. Previous crops: Potatoes 1970, fallow 1971.

NOTE: Seedling emergence counts were made in April. Mildew (Erysiphe graminis) was assessed on five occasions throughout the season. Brown rust (Puccinia hordei) was assessed in late July. In early August fertile tiller counts were made, and on 17 August harvest samples were taken for assessment of tiller and ear sizes.

Standard error per plot.
Grain, tonnes/hectare: 0.216 or 3.6% (21 d.f.)

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72/R/B/6

TABLES OF MEANS

GRAIN: TONNES/HECTARE

F

O	E	EL	L	Mean
5.46	5.75	6.59	6.03	5.96

STANDARD ERROR OF DIFFERENCES
F 0.108

STRAW: TONNES/HECTARE

F

O	E	EL	L	Mean
4.55	5.14	6.13	5.19	5.25

Mean D.M. %: Grain: 86.2
Straw: 92.0

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72/R/B/9

BARLEY

FUNGICIDES

Object: To study the effects of three fungicides applied as seed dressings and one as a spray on yields and pathogens of barley - West Barnfield II.

Sponsors: J. Jenkyn, R.D. Prew.

Design: 3 randomised blocks of 5 plots.

Whole plot dimensions: 2.13 x 13.4. Area harvested: 0.00195.

Treatments: Fungicide (F)

None		(0)
Seed dressings:	Organo-mercury at 350 g	(M)
	'Vitavax' plus thiram at 350 g	(V)
	BAS 3302 at 314 g	(BB)
Spray:	BAS 3170F at 1.12 kg a.i. in 674 l	(BA)

Rates given for seed dressings are of commercial formulations.

Basal applications: 500 kg (20:10:10) combine drilled. Weedkillers: Paraquat at 0.42 kg ion in 220 l on 2 occasions. Ioxynil, bromoxynil, 2,4-DP and MCPA ('Tetroxone' at 5.6 l in 220 l).

Seed: Sultan (infected with loose smut, undressed apart from treatments) sown at 160 kg.

Cultivations, etc.:- Paraquat applied: 24 and 30 Sept, 1971. Ploughed: 12 Nov. Seed combine drilled: 24 Mar, 1972. 'Tetroxone' applied: 8 May. BAS 3170F applied: 23 June. Combine harvested: 22 Aug. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Seedling emergence counts were made, and samples taken for root diseases in May and July. Mildew (Erysiphe graminis) was assessed in mid-June and late July and loose smut (Ustilago nuda) and brown rust (Puccinia hordei) in July.

Standard error per plot.
Grain, tonnes/hectare: 0.190 or 4.2% (8 d.f.)

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72/R/B/9

TABLE OF MEANS

GRAIN: TONNES/HECTARE

F

O	M	V	BB	BA	Mean
4.56	4.29	4.57	4.66	4.62	4.54

STANDARD ERROR OF DIFFERENCES
F 0.155

Mean D.M. %: 86.2

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72/R/B/10

BARLEY

METHODS OF APPLYING PHENYLPHOSPHONIC ACID

Object: To study the effects of a range of rates of phenylphosphonic acid, applied as a seed dressing or foliar spray, on yield and nitrogen uptake of barley - Pastures.

Sponsor: A. Penny.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 1.83 x 3.66. Area harvested: 0.00032.

Treatments: All combinations of:-
1. Rates of phenylphosphonic acid (PPA): None (0), 0.28 kg (1), 0.57 kg (2), 1.13 kg (4).
2. Methods of application: As a seed dressing (D), as a spray in 300 l at 5 leaf stage on 16 May (S).
3. Levels of N: 56, 112 kg as 'Nitro-Chalk'.

Basal applications: 310 kg (0:20:20) broadcast on the seedbed. Weedkillers: Paraquat at 5.6 kg ion in 220 l. Dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l in 340 l).

Seed: Julia, dressed ethirimol, sown at 140 kg.

Cultivations, etc.: Paraquat applied: 2 Oct, 1971. Ploughed: 23 Nov. N and basal PK applied: 23 Mar, 1972. Seed drilled: 24 Mar. 'Mephetol Plus' applied: 18 May. Cut by sickle: 17 Aug. Previous crops: Beans 1970, barley 1971.

NOTE: Green crop samples were taken on 3 July, 1972 for total dry matter and % N. Grain and straw were sampled at harvest for % N.

Standard error per plot.
Grain, tonnes/hectare: 0.337 or 5.5% (34 d.f.)

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72/R/B/10

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	PPA				METHOD		
	0	1	2	4	D	S	Mean
N: KG/HA							
56	6.00	6.10	6.24	6.10	6.07	6.23	6.11
112	5.77	6.22	6.33	5.89	6.11	6.18	6.05
				PPA			
				0			5.88
				1	6.24	6.08	6.16
				2	6.31	6.25	6.28
				4	5.71	6.29	6.00
Mean					6.09	6.21	6.08

Mean D.M. %: 80.3

NOTE: The N x METHOD table is meaned over PPA1, 2 and 4 only.

STANDARD ERRORS OF DIFFERENCES

N	PPA	METHOD	N PPA	N METHOD	PPA METHOD
0.097	0.138	0.122	0.195	0.159	0.195

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72/R/B/10

STRAW: TONNES/HECTARE

	PPA				METHOD		
	0	1	2	4	D	S	Mean
N: KG/HA							
56	6.00	6.23	6.38	6.02	6.08	6.35	6.16
112	6.94	7.13	6.55	6.38	6.58	6.79	6.75
				PPA			
				0			6.47
				1	6.51	6.84	6.68
				2	6.48	6.45	6.46
				4	5.99	6.42	6.20
Mean					6.33	6.57	6.45

Mean D.M. %: 57.0

NOTE: The N x METHOD table is meaned over PPA1, 2 and 4 only.

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72/S/B/1

BARLEY

VARIETIES, PPA, RATES AND TIMES OF N

Object: To study the effects of a range of nitrogen levels, applied to seedbed or in May, on the yield of two barley varieties. The effects of dressing seed with phenylphosphonic acid are also studied - Saxmundham Grove Plot.

Sponsors: F.V. Widdowson, A. Penny.

Design: 2 x 3 x 2 x 2 in 2 randomised blocks of 6 plots split into 2 breadthways and lengthways.

Whole plots dimensions: 2.74 x 12.2. Sub plot area harvested: 0.00052.

Treatments: All combinations of:-

Whole plots: 1. Varieties: Julia, Midas.
2. N levels: 50, 100, 150 kg N as calcium nitrate.

Sub plots: 3. Time of application of N: To seedbed (E), top dressed (L).
4. Seed dressing (SD): None (O), phenylphosphonic acid (D) at 0.38 kg.

Basal applications: 310 kg (0:20:20) to seedbed. Weedkiller: Dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l). Fungicide: Tridemorph at 0.53 kg.

Seed: Sown at 190 kg.

Cultivations, etc.: Ploughed: Oct, 1971. Seedbed N and basal PK applied, seed drilled: 27 Mar, 1972. N top dressed, weedkiller and fungicide applied: 16 May. Cut by hand: 21 Aug. Previous crop: Barley.

Standard errors per plot. Grain, tonnes/hectare:

Whole plot		0.208 or 4.7% (11 d.f.)
Sub plot	Application:	0.410 or 9.3% (12 d.f.)
	SD:	0.255 or 5.8% (12 d.f.)
	Application x SD:	0.462 or 10.4% (12 d.f.)

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72/S/B/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N: KG/HA			APPLICATION		SD		
	50	100	150	E	L	O	D	Mean
VARIETY								
Julia	3.97	4.90	5.05	4.77	4.51	4.92	4.36	4.64
Midas	4.09	4.28	4.29	4.60	3.84	4.29	4.15	4.22
			N: KG/HA					
			50	4.13	3.94	4.22	3.84	4.03
			100	4.92	4.26	4.76	4.42	4.59
			150	5.01	4.34	4.84	4.50	4.67
					APPLICATION			
					E	4.84	4.53	4.68
					L	4.38	3.97	4.18
Mean						4.61	4.25	4.43

Mean D.M. %: 86.2

STANDARD ERRORS OF DIFFERENCES

VARIETY	N	APPLICATION	SD	VARIETY N	VARIETY APPLICATION	VARIETY SD
0.120	0.147	0.167	0.104	0.208	0.206	0.159
Unless same level of VARIETY					0.237	0.147

	N APPLICATION	N SD	APPLICATION SD
	0.252	0.195	0.197
Unless same level of N	0.290	0.181	
APPLICATION			0.169
SD			0.214

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72/S/B/1

STRAW: TONNES/HECTARE

	N: KG/HA			APPLICATION		SD		
	50	100	150	E	L	O	D	Mean
VARIETY								
Julia	3.69	5.28	6.05	5.26	4.75	5.24	4.77	5.01
Midas	4.81	5.33	6.28	5.81	5.14	5.66	5.28	5.47
			N: KG/HA					
			50	4.33	4.16	4.49	4.01	4.25
			100	5.69	4.92	5.44	5.17	5.31
			150	6.58	5.75	6.42	5.90	6.16
				APPLICATION				
					E	5.74	5.33	5.53
					L	5.16	4.72	4.94
Mean						5.45	5.03	5.24

Mean D.M. %: 86.1

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72/R/BE/1

SPRING BEANS

EFFECTS OF MASS SELECTION

Object: To study the effects on yield of mass selecting a population of beans on the basis of number of pods per stem - Long Hoos V 5.

Sponsor: J. McEwen.

Design: 6 randomised blocks of 5 plots.

Whole plot dimensions: 2.03 x 4.27. Area harvested: 0.00019.

Treatments (T): Unselected (0) and mass selections from 1971 crop on the basis of number of pods per stem at harvest 1971:-

Pods per stem:-	1 - 4	(1)
	5 - 8	(5)
	9 - 12	(9)
	More than 12	(13)

Basal applications: 1570 kg (0:14:28). Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl at 0.25 kg in 340 l and later at 1.0 kg in 340 l.

Seed: Maris Bead sown at 170 kg.

Cultivations, etc.: Basal PK applied: 30 Sept, 1971. Ploughed: 6 Oct. Rotary cultivated: 16 Mar, 1972. Seed drilled: 17 Mar. Weedkiller applied: 21 Mar. Insecticide applied: 26 June and 19 July. Hand harvested: 29 Sept. Previous crops: Barley 1970, fallow 1971.

NOTE: Counts were made of number of stems and pods. 1000 grain weights were measured.

Standard error per plot.
Grain, tonnes/hectare: 0.479 or 9.7% (20 d.f.)

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72/R/BE/1

TABLE OF MEANS

GRAIN: TONNES/HECTARE

T

0	1	5	9	13	Mean
4.85	4.97	5.06	4.77	5.03	4.94

STANDARD ERROR OF DIFFERENCES
T 0.277

Mean D.M. %: 81.5

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72/R/BE/2

SPRING BEANS

VARIETIES AND VIRUSES

Object: To study the spread and effects on yield of Broad Bean Stain and True Mosaic Viruses in different varieties of beans - Great Knott III.

Sponsor: A.J. Cockbain.

Design: 6 randomised blocks of 4 plots.

Whole plot dimensions: 6.40 x 15.2. Area harvested: 0.00488.

Treatments: Varieties and sowing dates:

Sown on 29 Mar, 1971:	Herz Freya	(HF)
	Maris Bead	(MB)
	Minor	(M)
Sown on 4 Apr:	Tarvin	(T)

NOTE: Tarvin was not available at date of sowing the other varieties.

Basal applications: Ground chalk at 7.5 tonnes. FYM at 30 tonnes. 400 kg (0:14:28) placement drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l, simazine at 0.84 kg in 220 l. Insecticide: Phorate at 1.1 kg as granules.

Seed: Sown at 220 kg.

Cultivations, etc.: Ground chalk applied: 3 Sept, 1971. Paraquat applied: 30 Sept. FYM applied: 15 - 22 Nov. Ploughed: 15 - 24 Nov. Simazine applied: 2 May. Insecticide applied: 20 June. Combine harvested: 26 Sept. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Incidence of viruses and infestation by weevils were assessed.

Standard error per plot.
Grain, tonnes/hectare: 0.184 or 5.7% (23 d.f.)

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72/R/BE/2

TABLE OF MEANS

GRAIN: TONNES/HECTARE

VARIETY

HF	MB	M	T	Mean
3.16	3.48	3.21	3.15	3.25

STANDARD ERROR OF DIFFERENCES
VARIETY 0.106

Mean D.M. %: 81.3

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72/R/BE/3

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 72/R/CS/95) - Great Knott III.

Sponsors: A.J. Cockbain, R. Bardner, G.A. Salt.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 15.2. Area harvested: 0.00615.

Treatments (T): None (O)
Aldicarb nematicide at 4.5 kg applied in granules (A)
Gamma BHC insecticide at 2.2 kg in 2220 l (B)
Dexon fungicide at 79 kg as a dust (DE
Dieldrin insecticide at 2.2 kg in 2220 l (DI
Treatments applied and all plots rotary cultivated: 23 Mar, 1972.

Basal applications: Ground chalk at 7.5 tonnes. FYM at 30 tonnes. 400 kg (0:14:28) 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 440 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.: Chalk applied: 3 Sept, 1971. Paraquat applied: 30 Sept FYM applied: 15-22 Nov. Ploughed: 15-24 Nov. Seed placement drilled: 24 Mar, 1972. Simazine applied: 2 May. Demeton-s-methyl applied: 24 June. Combine harvested: 26 Sept. Previous crops: Winter wheat 197C barley 1971.

NOTE: Incidence of viruses was assessed on 3 occasions. Infestations by weevils, aphids and stem eelworm were also assessed.

Standard error per plot.
Grain, tonnes/hectare: 0.191 or 5.2% (12 d.f.)

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72/R/BE/3

TABLE OF MEANS

GRAIN: TONNES/HECTARE

	T				
O	A	B	DE	DI	Mean
3.43	3.95	3.60	3.81	3.58	3.68

STANDARD ERROR OF DIFFERENCES
T 0.135

Mean D.M.%: 82.5

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72/R/BE/4

SPRING BEANS

EFFECTS OF APHIDS

Object: To study the effects of applying liquid or granular insecticides at different times on yield and aphid control on beans - Great Knott III.

Sponsors: R. Bardner, J.H. Stevenson, J.R. Moffatt.

Design: 5 randomised blocks of 6 plots.

Whole plot dimensions: 5.33 x 12.2. Area harvested: 0.00390.

Treatments: Insecticides (I):-

None	(O)
Phorate granules at 1.12 kg:-	
At start of flowering	(GE)
At end of flowering	(GL)
Demeton-s-methyl spray at 0.25 kg in 440 l:-	
At start of flowering	(SE)
At end of flowering	(SL)
At start and again at end of flowering	(SEL)

Basal applications: Ground chalk at 7.5 tonnes. FYM at 30 tonnes. 400 kg (0:14:28) placement drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l, simazine at 0.84 kg in 220 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.: Chalked: 3 Sept, 1971. Paraquat applied: 30 Sept. FYM applied: 15 - 22 Nov. Ploughed: 24 Nov. Seed placement drilled: 24 Mar, 1972. Simazine applied: 2 May. Phorate applied: GE plots - 15 June, GL plots - 21 July. Demeton-s-methyl applied: SE and SEL plots - 26 June, SL and SEL plots - 20 July. Combine harvested: 26 Sept. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Aphid counts were made throughout the season. Estimates of plant growth were made. Plant measurements were taken just before harvest.

Corrigendum to 71/R/BE/5: Under 'Treatments' - the amount of demeton-s-methyl sprayed on each occasion was 245 g in 562 l and not as shown.

Standard error per plot.
Grain, tonnes/hectare: 0.356 or 11.6% (20 d.f.)

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72/R/BE/4

TABLES OF MEANS

GRAIN: TONNES/HECTARE

I

O	SE	SL	SEL	GE	GL	Mean
3.16	3.11	2.97	3.15	3.19	2.90	3.08

STANDARD ERROR OF DIFFERENCES
I 0.225

Mean D.M. %: 82.1

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72/R/BE/6

SPRING BEANS

EFFECTS OF HEAT TREATMENT

Object: To study the effects of various heat treatments of seed on germination, incidence of seed-borne viruses and yield of beans - Garden Plot 9 and Long Hoos V 4.

Sponsors: A.J. Cockbain, S. Vorra Urai.

Design (each field): 4 randomised blocks of 8 plots.

Whole plot dimensions:
Garden Plot 9: 2.03 x 10.1. Area harvested: 0.00090.
Long Hoos V 4: 2.03 x 10.1. Area harvested: 0.00102.

Treatments: Heat treatment (HT):

Period (days)	Temperature (°C)	
None		(0)
4	46.5 - 47.5	(1)
8	46.5 - 47.5	(2)
12	46.5 - 47.5	(3)
8	46.5 - 47.5 (after 14 days at 37°C)	(4)
16	25, 47 alternating	(5)
8	45 - 46	(6)
8	48 - 49	(7)

Basal applications: Garden Plot 9: 630 kg (0:20:20) ploughed down in autumn 1971. Long Hoos V 4: 1570 kg (0:14:28) ploughed down in autumn. Weedkiller (both fields): Simazine at 0.84 kg in 340 l. Insecticide (both fields): Demeton-s-methyl at 0.25 kg in 340 l.

Seed: Maris Bead sown at 220 kg.
Garden Plot 9: Seed from Bridget's Experimental Husbandry Farm with 8% BBSV/EAMV infection.
Long Hoos V 4: Seed once grown from Rothamsted farm with 2% BBSV/EAMV infection.

Cultivations, etc.:
Garden Plot 9: Basal PK applied: 7 Dec, 1971. Ploughed: 9 Dec. Seed drilled: 21 Apr, 1972. Weedkiller applied: 25 Apr. Insecticide applied: 28 June. Combine harvested: 19 Oct. Previous crops: Beans 1970, potatoes 1971.
Long Hoos V 4: Basal PK applied: 30 Sept, 1971. Ploughed: 7 Oct. Seed drilled: 19 Apr, 1972. Weedkiller applied: 26 Apr. Insecticide applied: 26 June. Combine harvested: 4 Oct. Previous crops: Spring wheat 1970, peas 1971.

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NOTE: Seedlings with symptoms of broad bean stain virus/broad bean true mosaic virus were counted and rogued on 24 May, 14 June and 14 July. Plant height and leaflet width (1st leaf) were recorded on 23 May.

Standard errors per plot.
Grain, tonnes/hectare: Garden Plot 9: 0.308 or 11.0% (21 d.f.)
Long Hoos V 4: 0.345 or 10.6% (21 d.f.).

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72/R/BE/6

TABLES OF MEANS

GRAIN: TONNES/HECTARE

GARDEN PLOT 9

HT

0	1	2	3	4	5	6	7	Mean
2.95	2.98	2.65	2.81	2.97	2.66	2.72	2.77	2.81

STANDARD ERROR OF DIFFERENCES
HT 0.218

Mean D.M.%: 79.2

LONG HOOS V 4

HT

0	1	2	3	4	5	6	7	Mean
3.29	3.13	3.01	2.90	3.43	3.43	3.31	3.46	3.24

STANDARD ERROR OF DIFFERENCES
HT 0.244

Mean D.M.%: 80.1

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72/R/BE/8

SPRING BEANS

N, CARBOHYDRATE AND IRRIGATION

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 V 5.

Sponsor: J. McEwen.

Design: 3 randomised blocks of 2 plots, split into 4.

Whole plot dimensions: 2.03 x 4.27. Sub plot area harvested: 0.00019.

Treatments: All combinations of:-
Whole plots: 1. Irrigation (I): None (0), irrigated for 3 weeks after first flowers seen (3).
Sub plots: 2. Nitrogen just before flowering: None, 150 kg N as 'Nitro-Chalk'.
3. Carbohydrate (C): None (0), sucrose at 150 kg (half when first flowers seen, half two weeks later) (S).
Irrigation applied by watering can on 16, 17, 24, 27 June, 5 July - 6.3 mm on each occasion. Sucrose was applied as a foliar spray in 1,000 l.

Basal applications: 1570 kg (0:14:28) in autumn. Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl at 0.25 kg in 340 l and later at 1 kg in 340 l. Fungicide: Benomyl at 0.75 kg in 1000 l on 2 occasions (applied with sucrose to C plots).

Seed: Minor sown at 224 kg.

Cultivations, etc.: Ploughed: 6 Oct, 1971. Basal PK applied: 30 Sept. Rotary cultivated: 16 Mar, 1972. Seed drilled: 17 Mar. Weedkiller applied: 21 Mar. N applied: 14 June. Benomyl and sucrose applied: 20 June. Insecticide applied: 26 June. Benomyl and sucrose applied: 7 July. Insecticide applied: 19 July. Hand harvested: 28 Sept. Previous crops: Barley 1970, fallow 1971.

NOTE: Counts were made of number of stems and pods. 1000 grain weights and % N in grain were measured.

Standard error per plot.
Grain, tonnes/hectare: Sub plot: 0.157 or 3.4% (12 d.f.).

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72/R/BE/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N: KG/HA		C		
	0	150	0	S	Mean
I					
0	4.28	4.64	4.42	4.50	4.46
3	4.61	4.82	4.82	4.60	4.71
		N: KG/HA			
		0	4.47	4.42	4.45
		150	4.78	4.68	4.73
Mean			4.62	4.55	4.59

STANDARD ERRORS OF DIFFERENCES

N	C	I* N	I* C	N C
0.064	0.064	0.091	0.091	0.091

* Within the same level of I only

Mean D.M. %: 83.2

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72/R/BE/9

SPRING BEANS

ROGUING AND VIRUSES

Object: To study the effects of roguing on spread of Broad Bean Stain and True Mosaic Viruses and on yield of beans - Great Knott III.

Sponsors: A.J. Cockbain, S. Vorra Urai.

Design: 4 randomised blocks of 3 plots.

Whole plot dimensions: 6.40 x 15.2. Area harvested: 0.00465.

Treatments: Roguing:- None (0), rogued once (1) (12 May), rogued repeatedly (R) (12 May, 22 May, 8 June).

Basal applications: Ground chalk at 7.5 tonnes. FYM at 30 tonnes. 400 kg (0:14:28) placement drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Simazine at 1.12 kg in 220 l. Insecticide: Phorate at 1.12 kg as granules.

Seed: Maris Bead sown at 220 kg.

Cultivations, etc.: Chalk applied: 3 Sept, 1971. Paraquat applied: 30 Sept. FYM applied: 15-22 Nov. Ploughed: 15-24 Nov. Seed placement drilled: 22 Mar, 1972. Simazine applied: 2 May. Insecticide applied: 20 June. Combine harvested: 26 Sept. Previous crops: Winter wheat 1970, barley 1971.

NOTE: Incidence of broad bean stain/broad bean true mosaic viruses was assessed in untreated plots on 11 May, 22 June and 16 August and in R1 plots on 22 June and 16 August. Incidence of viruses in harvested seed was assessed.

Standard error per plot.
Grain, tonnes/hectare: 0.329 or 9.1% (6 d.f.).

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72/R/BE/9

TABLE OF MEANS

GRAIN: TONNES/HECTARE

ROGUING

0	1	R	Mean
3.60	3.65	3.65	3.63

STANDARD ERROR OF DIFFERENCES
ROGUING 0.233

Mean D.M.%: 82.3

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72/R/P/1

POTATOES

SPACING, SEED SIZE AND FERTILISER

Object: To study the effects of different spacings, within and between rows, seed size and fertiliser rates on yield and size grades of potatoes - Great Knott I.

Sponsors: G.A. Hide, J.M. Hirst, J.R. Moffatt, F.V. Widdowson.

Design: 4 blocks of 8 plots, randomisation restricted, split into 4.

Whole plot dimensions:
N plots - 2.84 x 44.7 W plots - 3.66 x 44.7.
Sub plot area harvested: 0.00116.

Treatments:
Whole plots: All combinations of:-
1. Row spacing (RS): 71.1 cm (28 inches) (N), 91.4 cm (36 inches) (W).
2. Seed size (SS): Small (S), large (L). All seed chitted.
3. Compound fertiliser (13:13:20) (F): 1510, 3020 kg.

Sub plots:
4. Spacing of seed within the row (SR): Seed 30.5 cm (12 inches) (3), 40.6 cm (16 inches) (4), 50.8 cm (20 inches) (5), 61.0 cm (24 inches) (6) apart within the row.

The seed was dusted with 5% 'Benlate' at approximately 3.57 kg per tonne, after being sorted into 2 seed sizes, 3.18 cm to 4.76 cm, and 4.76 cm to 5.72 cm, for the S and L treatments.

Basal applications: Manures: None. Weedkiller: Linuron at 0.84 kg plus paraquat at 0.42 lb ion in 440 l. Fungicide: Mancozeb at 1.4 kg in 440 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg on the second occasion with the mancozeb.

Seed: King Edward.

Cultivations, etc.: Ploughed: 5 Nov, 1971. NPK treatments applied: 22 - 24 Apr, 1972. Rotary cultivated: 26 Apr. Potatoes hand planted: 27 Apr. Weedkiller applied: 18 May. Fungicide applied: 11 July, 24 July, 11 Aug. Insecticide applied: 24 July.

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72/R/P/1

Sprayed with undiluted BOV at 200 l: 20 Sept. Lifted: 5 Oct.
Previous crops: Barley 1970, fallow 1971.

NOTE: Counts were made of plant and stem numbers after burning off and before lifting. Tubers were graded into 6 sizes.

Standard errors per plot. Total tubers, tonnes/hectare:
Whole plot: 2.68 or 6.6% (21 d.f.)
Sub plot: 2.82 or 6.9% (72 d.f.)

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72/R/P/1

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	SS		F		SR:CM				
	Small	Large	1510	3020	30.5	40.6	50.8	61.0	Mean
RS:CM									
71.1	42.6	43.4	40.6	45.4	42.6	42.9	42.9	43.5	43.0
91.4	38.6	39.0	36.4	41.2	37.3	37.9	40.6	39.5	38.8
SS									
Small			38.4	42.8	39.9	40.6	40.6	41.2	40.6
Large			38.6	43.8	39.9	40.2	42.8	41.8	41.2
F									
1510					37.0	37.7	39.5	39.8	38.5
3020					42.9	43.1	44.0	43.2	43.3
Mean					39.9	40.4	41.7	41.5	40.9

STANDARD ERRORS OF DIFFERENCES

RS	SS	F	SR	RS SS	RS F	SS F	RS SR	SS SR	F SR
0.95	0.95	0.95	0.70	1.34	1.34	1.34	1.28	1.28	1.28

Unless same levels of

RS			1.00
SS		1.00	
F			1.00

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PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

	SS		F		SR:CM				
	Small	Large	1510	3020	30.5	40.6	50.8	61.0	Mean
RS									
71.1	70.4	62.9	63.2	70.1	59.3	65.9	68.7	72.6	66.6
91.4	77.1	70.2	71.8	75.5	67.4	73.2	75.8	78.2	73.7
		SS							
		Small	71.6	75.8	67.1	73.3	75.7	78.8	73.7
		Large	63.4	69.7	59.6	65.8	68.8	72.0	66.5
				F					
				1510	58.6	66.7	70.2	74.5	67.5
				3020	68.1	72.4	74.3	76.3	72.8
Mean					63.3	69.6	72.2	75.4	70.1

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72/W/P/1

POTATOES

FORMALIN AND POTATO CYST NEMATODE

Object: To study the effects of formalin on yield of potatoes and incidence of Heterodera rostochiensis - Woburn Long Mead and Butt Close.

Sponsor: A.G. Whitehead.

Design: Long Mead: 3 blocks of 8 plots, Butt Close: 2 blocks of 8 plots.

Whole plot dimensions: 2.84 x 6.10. Area harvested: 0.00087.

Treatments (T): Dazomet: None (0), 336 kg (D) together with all combinations of:-

1. Rates of formalin (40% formaldehyde): 1.25 tonnes (F1), 2.5 tonnes (F2), 5.0 tonnes (F4).
2. Methods of application of formalin: Undiluted (0), in 27,000 l water (W).

Basal applications: 1510 kg (13:13:20). Weedkiller: Chlorbromuron at 1.7 kg with paraquat at 0.42 kg ion in 370 l, (Long Mead). Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l, (Butt Close). Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

Cultivations, etc.:

Long Mead: Ploughed: 8 Oct, 1971. Dazomet and undiluted formalin applied and plots rotary cultivated twice, remaining plots rotary cultivated and formalin drench applied: 8 Dec. Ploughed: 29 Feb, 1972. NPK applied: 30 Mar. Rotary cultivated, potatoes planted: 6 Apr. Inter-row rotary cultivated and earthed up: 19 Apr. Weedkiller applied: 8 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 14 Sept. Lifted: 22 Sept. Previous crops: Potatoes 1970 and 1971.

Butt Close: Deep-tine cultivated: 1 Nov, 1971. Dazomet and undiluted formalin applied and plots rotary cultivated twice, remaining plots rotary cultivated and formalin drench applied: 7 Dec. Ploughed: 14 Feb, 1972. NPK applied: 29 Mar. Rotary cultivated, potatoes planted, inter-row rotary cultivated and earthed up: 20 Apr. Weedkiller applied: 15 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July. Haulm mechanically destroyed: 14 Sept. Lifted: 20 Sept. Previous crops: Potatoes 1970 and 1971.

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NOTE: Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of Heterodera rostochiensis.

Standard error per plot. Total tubers, tonnes/hectare:
Long Mead: 7.17 or 26.8% (14 d.f.)
Butt Close: 3.67 or 23.5% (7 d.f.)

TABLES OF MEANS

LONG MEAD

F

O	D	F1	F2	F4	F1W	F2W	F4W	Mean
TOTAL TUBERS: TONNES/HECTARE								
18.2	29.4	27.6	26.3	34.3	21.6	25.5	31.5	26.8

STANDARD ERROR OF DIFFERENCES. F 5.86

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE								
88.6	92.7	93.2	93.6	94.7	90.4	88.7	92.7	91.8

BUTT CLOSE

F

O	D	F1	F2	F4	F1W	F2W	F4W	Mean
11.4	26.7	12.7	13.2	20.5	12.4	11.9	16.1	15.6

STANDARD ERROR OF DIFFERENCES. F 3.67

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE								
79.5	93.1	81.7	85.1	91.7	81.8	77.1	89.0	84.9

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72/R/P/2 and 72/W/P/2

POTATOES

SEED STOCKS, DISEASES AND FUNGICIDES

Object: To study the effects of systemic fungicides and re-infection with Oospora and Rhizoctonia on potato stocks either freed from these diseases, by the use of stem cuttings, or not - Rothamsted (R) Great Knott I and Woburn (W) Horsepool Lane Close.

Sponsors: G.A. Hide, J.M. Hirst, F. Bell.

Design: 4 blocks of 12 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. Seed stocks, chitting, diseases, times of inoculation and fungicide (T):

F, FB, FC, FCB, H, HC, HCB, HCBP, HCOE, HCOL, HCRL, HCORL,

where F = Farm stock*.
H = Healthy seed (from stem cuttings).
B = Seed treated with fungicide (Benomyl 5% dust at 4.46 kg per tonne of seed).
P = Seed treated with fungicide (Plantvax 10% dust at 4.46 kg per tonne of seed).
C = Chitted seed.
O = Seed inoculated with Oospora.
R = Seed inoculated with Rhizoctonia.
E = Early inoculation.
L = Late inoculation.

Sub plots: 2. Varieties: Great Knott I (R): Pentland Crown (PC), King Edward (KE), Majestic (M), Record (R).
Horsepool Lane Close (W): Pentland Crown (PC), Majestic (M), Maris Piper (MP), Record (R).

* Rothamsted once grown for Pentland Crown and King Edward. Scottish FS for Majestic, Record and Maris Piper.

Basal applications:-

Great Knott I (R): 1510 kg (13:13:20). Weedkiller: Linuron at 0.8 kg with paraquat at 0.4 kg ion in 440 l. Fungicide: Mancozeb at 1.3 kg in 440 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 440 l.

Horsepool Lane Close (W): 1510 kg (13:13:20). Weedkiller: Linuron at 1.1 kg with paraquat at 0.4 kg ion in 370 l. Paraquat at 0.4 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 430 l.

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72/R/P/2 and 72/W/P/2

Cultivations, etc.:-

Great Knott I (R): Ploughed: 5 - 11 Nov, 1971. NPK applied: 22 Apr, 1972. Rotary cultivated, potatoes planted: 25 - 26 Apr. Weedkiller applied: 18 May. Fungicide applied on three occasions: 11 July, 24 July, 10 Aug. Insecticide with fungicide applied on one occasion: 24 July. Sprayed with undiluted BOV at 200 l: 20 Sept. Lifted: 10 Oct. Previous crops: Barley 1970, fallow 1971.

Horsepool Lane Close (W): Deep-tine cultivated: 3 Nov, 1971. NPK applied: 30 Mar, 1972. Rotary cultivated: 24 Apr. Potatoes planted: 25 Apr. Linuron with paraquat applied: 11 May. Paraquat applied to 5 rows missed at the first application of weedkiller: 1 June. Fungicide applied: 6 July. Fungicide with insecticide applied: 27 July. Sprayed with undiluted BOV at 200 l: 25 Sept. Haulm mechanically destroyed: 28 Sept. Lifted: 9 - 11 Oct. Previous crops: Spring wheat 1970, fallow 1971.

NOTE: Emergence counts were made at the end of May. Samples were taken throughout the season for disease assessments on growing progeny tubers. After burning off and before lifting counts were made of plant and stem numbers. After harvest estimates were made of tuber infection with Oospora, Rhizoctonia, Helminthosporium and Phoma.

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

Great Knott I (R):	Whole plot:	2.79 or 6.1% (33 d.f.)
	Sub plot:	2.91 or 6.4% (108 d.f.)
Horsepool Lane Close (W):	Whole plot:	3.75 or 7.6% (33 d.f.)
	Sub plot:	3.37 or 6.8% (108 d.f.)

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72/R/P/2 and 72/W/P/2

TABLES OF MEANS

GREAT KNOTT I (R)

VARIETY

	KE	M	PC	R	Mean
T	TOTAL TUBERS: TONNES/HECTARE				
F	39.9	41.2	47.1	32.3	40.1
FB	41.5	47.3	47.2	35.5	42.9
FC	49.1	50.4	54.3	36.6	47.6
FCB	50.8	48.9	54.2	39.8	48.4
H	46.1	48.3	48.2	37.0	44.9
HC	46.5	51.6	52.9	36.1	46.8
HCB	45.3	51.7	47.0	35.3	44.8
HCBP	45.5	53.7	51.6	38.6	47.4
HCOE	46.9	53.5	51.1	35.9	46.9
HCOL	42.9	53.0	50.9	35.5	45.6
HCRL	44.8	52.4	49.9	35.7	45.7
HCORL	46.5	52.0	53.7	38.5	47.7
Mean	45.5	50.3	50.7	36.4	45.7

STANDARD ERRORS OF DIFFERENCES

	T	VARIETY	T VARIETY
	1.97	0.59	2.66
Unless same level of T			2.06

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72/R/P/2 and 72/W/P/2

GREAT KNOTT I (R)

VARIETY

	KE	M	PC	R	Mean
T	PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE				
F	59.8	80.8	83.1	73.5	74.3
FB	40.9	79.3	78.9	64.1	65.8
FC	63.6	77.1	85.7	76.8	75.8
FCB	58.6	81.9	82.4	73.7	74.2
H	58.6	76.9	85.2	76.0	74.2
HC	63.0	77.1	85.2	72.3	74.4
HCB	50.1	72.9	83.4	73.6	70.0
HCBP	54.8	73.4	84.5	69.1	70.5
HCOE	62.2	77.6	83.7	67.1	72.7
HCOL	65.8	77.6	86.2	74.0	75.9
HCRL	58.6	72.5	84.0	69.4	71.1
HCORL	68.0	76.9	85.4	75.5	76.5
Mean	58.7	77.0	84.0	72.1	72.9

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72/R/P/2 and 72/W/P/2

HORSEPOOL LANE CLOSE (W)

VARIETY

T	M	MP	PC	R	Mean
	TOTAL TUBERS: TONNES/HECTARE				
F	45.7	38.5	48.4	36.8	42.4
FB	53.8	42.4	50.4	42.2	47.2
FC	49.3	45.7	56.8	41.8	48.4
FCB	49.5	47.2	57.3	40.9	48.7
H	53.1	46.8	55.0	45.2	50.0
HC	56.5	45.3	53.3	37.1	48.0
HCB	63.2	47.9	58.0	42.5	52.9
HCBP	59.5	51.3	57.9	40.3	52.2
HCOE	62.5	50.3	58.8	42.8	53.6
HCOL	56.9	47.1	55.2	40.2	49.8
HCRL	55.9	47.7	57.3	40.1	50.2
HCORL	56.1	47.6	55.7	41.1	50.1
Mean	55.2	46.5	55.3	40.9	49.5

STANDARD ERRORS OF DIFFERENCES

	T	VARIETY	T VARIETY
	2.65	0.69	3.36
Unless same level of T			2.38

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72/R/P/2 and 72/W/P/2

HORSEPOOL LANE CLOSE (W)

VARIETY

	M	MP	PC	R	Mean
T	PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE				
F	77.3	60.1	82.2	75.8	73.8
FB	77.5	50.6	76.9	68.5	68.4
FC	75.3	69.7	86.1	77.0	77.0
FCB	76.3	68.9	80.2	73.2	74.7
H	79.1	58.3	88.9	82.0	77.1
HC	69.8	50.5	87.0	58.9	66.6
HCB	79.8	60.1	84.5	68.5	73.2
HCBP	77.8	58.1	86.5	70.1	73.1
HCOE	79.1	62.6	82.5	69.2	73.4
HCOL	73.1	59.2	87.3	68.2	72.0
HCRL	71.1	55.4	86.7	61.8	68.8
HCORL	78.5	69.4	88.9	75.4	78.0
Mean	76.2	60.2	84.8	70.7	73.0

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72/R/P/3

POTATOES

BLIGHT AND APHID REFERENCE PLOTS

Object: To study the separate and combined effects of sprays to control blight and aphids on potatoes - Delafield.

Sponsors: J.M. Hirst, O.J. Stedman, R.W. Gibson.

Design: 4 randomised blocks of 5 plots, split into 3.

Whole plot dimensions: 8.53 x 9.53. Sub plot area harvested: 0.00271.

Treatments:

Whole plots: Sprayed with blight fungicide as treatment (F), plot used for sampling (no yields recorded) and all combinations of:-

1. Fungicide: None (0), sprayed on 3 occasions with mancozeb at 1.3 kg in 440 l (3).
2. Aphicide (A): None (0), sprayed on 3 occasions with demeton-s-methyl at 0.25 kg in 440 l (3).

Sub plots:

3. Varieties: King Edward (KE), Majestic (M), Pentland Crown (PC).

Basal applications: 1510 kg (13:13:20). Weedkiller: Linuron at 0.8 kg and paraquat at 0.4 kg ion in 440 l.

Cultivations, etc.: Ploughed: 15 Oct, 1971. Basal NPK applied: 20 Apr, 1972. Rotary cultivated, machine planted: 24 Apr. Weedkiller applied: 17 May. Grubbed: 15 June. Ridged: 16 June. Mancozeb and demeton-s-methyl applied: 11 July, 24 July, 10 Aug. Sprayed with undiluted BOV at 200 l: 20 Sept. Lifted: 2 Oct. Previous crops: Barley 1970, fallow 1971.

NOTE: Aphid counts were made and estimates were made of the percentage of tubers blighted and of haulm destroyed by blight (Phytophthora infestans).

Standard errors per plot.

Total tubers, tonnes/hectare: Whole plot: 1.53 or 3.7% (9 d.f.)
Sub plot: 4.26 or 10.3% (24 d.f.)

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72/R/P/3

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

	APHICIDE		VARIETY			
	0	3	KE	M	PC	Mean
FUNGICIDE						
0	40.6	40.7	43.0	41.2	37.8	40.7
3	42.1	42.4	41.9	45.8	39.0	42.2
		0	42.3	44.0	37.7	41.3
		3	42.5	43.0	39.1	41.6
Mean			42.4	43.5	38.4	41.5

STANDARD ERRORS OF DIFFERENCES

FUNGICIDE	APHICIDE	VARIETY	FUNGICIDE APHICIDE	FUNGICIDE VARIETY	APHICIDE VARIETY
0.77	0.77	1.51	1.08	1.90	1.90
Unless same levels of					
FUNGICIDE				2.13	
APHICIDE					2.13

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72/R/P/3

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

	APHICIDE		VARIETY			
	0	3	KE	M	PC	Mean
FUNGICIDE						
0	95.4	94.7	92.5	95.5	97.2	95.1
3	95.5	94.9	92.4	96.1	97.2	95.2
		0	93.0	96.0	97.4	95.4
		3	91.9	95.6	97.0	94.8
Mean			92.4	95.8	97.2	95.1

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72/W/P/3

SPRAYS AND SCAB CONTROL

Object: To study the effects of different formulations of ethionine sprays on yield and common scab of potatoes - Woburn School Field and Gt Hill Bottom I.

Sponsor: A.H. McIntosh.

Design: 3 blocks of 4 plots.

Whole plot dimensions: 2.85 x 3.25. Area harvested: 0.00023.

Treatments (T):
1. None (0).
2. Ethionine, 2.9 kg (E).
3. Ethionine, 2.9 kg + dimethyl sulphoxide, 7.3 kg (E+D).
4. Ethionine, 2.9 kg + 'Manoxol-OT', 6.29 kg (E+W).

NOTE: Treatments were applied as sprays in 1460 l on three occasions.

Basal applications: 1500 kg (13:13:20). Weedkiller: Linuron at 1.1 kg in 370 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.24 kg in 430 l. Fungicide: Mancozeb at 1.3 kg in 430 l.

Variety: Maris Piper.

Cultivations, etc.:
School Field: Ploughed: 23 Sept, 1971. Deep-tine cultivated: 10 Nov. NPK applied: 24 Mar, 1972. Rotary cultivated, potatoes planted: 21 Apr. Weedkiller applied: 11 May. Treatments applied: 13 June, 16 June, 20 June. Fungicide applied: 6 July. Fungicide with insecticide applied: 28 July. Lifted: 11 Sept. Previous crops: Barley 1970, potatoes 1971.
Gt Hill Bottom I: Ploughed: 5 Nov, 1971. NPK applied: 29 Mar, 1972. Rotary cultivated, potatoes planted: 20 Apr. Weedkiller applied: 11 May. Treatments applied: 13 June, 16 June, 20 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 28 July. Lifted: 11 Sept. Previous crops: Potatoes 1970, barley 1971.

NOTE: Tuber samples were taken at harvest for scab assessments.

Standard errors per plot. Total tubers, tonnes/hectare:
School Field: 7.61 or 18.8% (6 d.f.)
Gt Hill Bottom I: 5.96 or 18.1% (6 d.f.)

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72/W/P/3

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

T

O	E	E+D	E+W	Mean
		SCHOOL FIELD		
41.7	41.8	41.1	37.6	40.5

STANDARD ERROR OF DIFFERENCES
T 6.22

		GT HILL BOTTOM I		
28.8	35.2	34.0	33.3	32.8

STANDARD ERROR OF DIFFERENCES
T 4.86

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72/R/P/5

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 certified stocks - Delafield.

Sponsors: J.M. Hirst, G.A. Hide, F. Bell.

Design: 2 randomised blocks of 2 plots, split into 24.

Whole plot dimensions: 5.69 x 73.2. Sub plot area harvested: 0.00135.

Treatments: All combinations of:-
Whole plots: 1. Varieties: King Edward (KE), Pentland Crown (PC).
Sub plots: 2. Seed sources:

Virus tested seed from Scotland (duplicated plots)	(1)
Seed once grown at Rothamsted from virus tested seed from Scotland (duplicated plots)	(2)
Certified seed from Scottish or Irish stocks	(3-12)
Once grown (English) stocks	(13-22)

Basal applications: 1500 kg (13:13:20). Weedkillers: Linuron at 0.84 kg plus paraquat at 0.42 kg ion in 440 l. Fungicide: Mancozeb at 1.3 kg in 440 l on 3 occasions. Insecticide: Demeton-s-methyl at 0.25 kg with the mancozeb on the second occasion.

Cultivations, etc.: Ploughed: 12 Oct, 1971. NPK applied: 20 Apr, 1972. Rotary cultivated, potatoes machine planted: 21 Apr. Grubbed: 15 June. Earthed up: 16 June. Fungicide applied: 11 July, 24 July, 10 Aug. Insecticide applied: 24 July. Lifted: 2 Oct. Previous crops: Barley 1970, fallow 1971.

NOTE: Emergence counts were made on May 22. Tubers were graded into 6 sizes and assessments made of Oospora, Rhizoctonia, Helminthosporium and Phoma infection.

Standard error per plot.
Total tubers, tonnes/hectare: Sub plot: 3.54 or 8.6% (50 d.f.)

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72/R/P/5

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

VARIETY

SEED	KE	PC	Mean
1	44.8	42.2	43.5
2	46.7	39.7	43.2
3	42.6	38.4	40.5
4	42.1	40.4	41.2
5	39.0	41.7	40.3
6	42.6	35.5	39.1
7	43.8	34.6	39.2
8	41.7	39.4	40.5
9	43.7	36.5	40.1
10	45.3	41.4	43.4
11	41.5	38.8	40.2
12	42.2	45.2	43.7
13	37.8	40.7	39.3
14	40.6	34.2	37.4
15	41.5	39.3	40.4
16	42.1	38.3	40.2
17	42.1	44.0	43.1
18	43.2	37.3	40.2
19	41.8	42.5	42.1
20	36.8	44.4	40.6
21	46.8	41.3	44.1
22	41.0	41.7	41.3
Mean	42.5	40.0	41.3

STANDARD ERRORS OF DIFFERENCES

SEED

	Between 3-22	2.50
	1 or 2 v 3-22	2.17
	1 v 2	1.77

VARIETY

SEED

Within the same VARIETY	Between 3-22	3.54
	1 or 2 v 3-22	3.07
	1 v 2	2.50

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72/R/P/5

PERCENTAGE WARE 4.44 CM (1.75 inch) RIDDLE

VARIETY

SEED	KE	PC	Mean
1	61.8	85.4	73.6
2	72.0	85.9	78.9
3	73.9	86.9	80.4
4	58.5	83.9	71.2
5	68.9	86.0	77.5
6	63.0	84.8	73.9
7	72.8	85.7	79.2
8	70.8	86.5	78.6
9	65.9	89.5	77.7
10	74.6	85.8	80.2
11	71.2	84.8	78.0
12	70.8	91.6	81.2
13	65.0	85.5	75.3
14	65.1	91.1	78.1
15	60.5	83.1	71.8
16	64.4	89.1	76.7
17	66.5	85.4	76.0
18	72.0	85.8	78.9
19	74.8	87.0	80.9
20	61.6	88.0	74.8
21	67.1	84.9	76.0
22	66.4	83.7	75.0
Mean	67.6	86.3	76.9

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72/R/SB/1

SUGAR BEET

EFFECTS OF COLLEMBOLA ON SEEDLINGS

Object: To study the effects of insecticides on seedling damage by Collembola and on final yield of sugar beet.

Sponsor: C.A. Edwards.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 4.58. Area harvested: 0.00146.

Treatments (T):

None	(O)
Chlorfenvinphos at 4.5 kg	(C)
Diazinon at 4.5 kg	(DN)
DDT at 6.7 kg and 11.2 kg	(DT)
Parathion at 4.5 kg	(P)

Treatments were applied to soil and worked in in December, 1971 with the exception of the second amount of DDT which was applied in May.

Basal applications: Chalk: 7.5 tonnes. 750 kg (20:15:15).
Weedkiller: Paraquat at 0.42 kg ion in 220 l.

Seed: Amono sown at 13 kg.

Cultivations, etc.: Chalk applied: 3 Sept, 1971. Weedkiller applied: 30 Sept. Ploughed: 13 - 15 Nov. Treatments applied and spring-tine cultivated in: 16 Dec. NPK applied: 6 Apr, 1972. Power harrowed: 17 Apr. Seed drilled: 18 Apr. Tractor hoed: 30 May. Lifted: 18 - 20 Oct. Previous crops: Wheat 1970, barley 1971.

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 error per plot.
Roots (washed), tonnes/hectare: 3.34 or 17.3% (12 d.f.)
Total sugar, tonnes/hectare: 0.609 or 18.1% (12 d.f.)

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TABLES OF MEANS

T

0	C	DN	DT	P	Mean
ROOTS (WASHED): TONNES/HECTARE					
18.4	18.0	19.4	21.4	19.5	19.3

STANDARD ERROR OF DIFFERENCES
T 2.37

SUGAR %

17.0	17.1	17.4	17.6	17.4	17.3

TOTAL SUGAR: TONNES/HECTARE

3.12	3.09	3.38	3.79	3.40	3.35

STANDARD ERROR OF DIFFERENCES
T 0.430

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72/R/M/5

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.

Sponsors: J.C. Wilson, J.W. Stephenson.

Design: 3 randomised blocks of 4 plots, split into 4.

Whole plot dimensions: 3.05 x 6.10. Sub plot area harvested: 0.000372.

Treatments: All combinations of:-
Whole plots: 1. Crops: Grain maize, Sweet corn.
2. Phorate: 0, 1.68 kg.
Sub plots: 3. Dimethoate spray (DS): None (0), 1.68 kg at 2-leaf stage (1), 1.68 kg at 2-leaf stage, repeated three weeks later (2), at 1.68 kg at first sign of frit fly attack (3).
Phorate was applied as granules drilled with the seed. Dimethoate was applied as a spray in 340 l.

NOTE: Frit fly did not attack and treatment DS3 was not applied and therefore equals DS0.

Seed: Grain maize: Pioneer 131 sown at 11,000 seeds per hectare.
Sweet corn: Early King sown at 11,000 seeds per hectare.

Basal applications: 1600 kg (0:14:28). 130 kg N as 'Nitro-Chalk'. Atrazine at 1.7 kg a.i. in 340 l.

Cultivations, etc.: PK applied: 30 Sept, 1971. Ploughed: 6 Oct. N applied, power harrowed: 2 May, 1972. Seed precision drilled: 3 May. Weedkiller applied: 12 May. Dimethoate applied: 12 June, 7 July. Harvested sweet corn at sweet corn stage: 13 Oct. Harvested grain maize at sweet corn stage: 30 Oct. Harvested sweet corn and grain maize at grain stage: 23 Nov.

NOTE: Observations were made on incidence of frit fly (Oscinella frit) throughout the season.

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Standard errors per plot.

Grain, tonnes/hectare:	Whole plot:	0.273 or 35.9%	(6 d.f.)
	Sub plot:	0.207 or 27.2%	(28 d.f.)
Total saleable cobs, tonnes/hectare:			
	Whole plot:	1.251 or 22.0%	(6 d.f.)
	Sub plot:	1.790 or 31.5%	(28 d.f.)
No. of saleable cobs: thousands/hectare:			
	Whole plot:	5.76 or 21.3%	(6 d.f.)
	Sub plot:	8.74 or 32.3%	(28 d.f.)

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72/R/M/5

TABLES OF MEANS

GRAIN: TONNES/HECTARE

PHORATE: KG/HA DIMETHOATE SPRAY (DS)

	PHORATE: KG/HA		DIMETHOATE SPRAY (DS)			
	0	1.68	0*	1	2	Mean
CROP						
Grain Maize	0.97	0.76	0.77	0.98	0.91	0.86
Sweet Corn	0.64	0.68	0.67	0.59	0.73	0.66
	PHORATE: KG/HA					
	0		0.78	0.81	0.84	0.80
	1.68		0.66	0.76	0.81	0.72
Mean			0.72	0.78	0.82	0.76

PHORATE: KG/HA	0			1.68		
DIMETHOATE SPRAY (DS)	0	1	2	0	1	2
CROP						
Grain Maize	0.93	1.13	0.89	0.62	0.84	0.94
Sweet Corn	0.64	0.49	0.79	0.69	0.68	0.67

Mean D.M. %: 73.1

* Duplicated treatment

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72/R/M/5

STANDARD ERRORS OF DIFFERENCES

GRAIN: TONNES/HECTARE

CROP	PHORATE	DS	CROP PHORATE	CROP DS	PHORATE DS	CROP PHORATE DS
0.158	0.158		0.223			
1 and 2		0.085		0.189	0.189	0.267
0 v 1 or 2		0.073		0.179	0.179	0.253
0				0.169	0.169	0.239
Unless same level of CROP						
1 and 2				0.120		
0 v 1 or 2				0.104		
Unless same level of PHORATE						
1 and 2					0.120	
0 v 1 or 2					0.104	
Unless same level of CROP and PHORATE						
1 and 2						0.169
0 v 1 or 2						0.147

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72/R/M/5

TOTAL SALEABLE COBS: TONNES/HECTARE

PHORATE: KG/HA DIMETHOATE SPRAY (DS)

	0	1.68	0*	1	2	Mean
CROP						
Grain Maize	6.42	6.98	6.88	6.89	6.13	6.70
Sweet Corn	4.61	4.75	4.17	4.54	5.84	4.68
PHORATE: KG/HA						
0			5.77	5.45	5.05	5.51
1.68			5.28	5.98	6.92	5.87
Mean			5.53	5.72	5.99	5.69

PHORATE: KG/HA	0			1.68		
DIMETHOATE SPRAY (DS)	0	1	2	0	1	2
CROP						
Grain Maize	7.00	6.61	5.05	6.76	7.18	7.21
Sweet Corn	4.54	4.30	5.05	3.80	4.78	6.63

* Duplicated treatment

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STANDARD ERRORS OF DIFFERENCES

TOTAL SALEABLE COBS: TONNES/HECTARE

CROP	PHORATE	DS	CROP PHORATE	CROP DS	PHORATE DS	CROP PHORATE DS
0.722	0.722		1.021			
1 and 2		0.731		1.150	1.150	1.627
0 v 1 or 2		0.633		1.028	1.028	1.453
0				0.888	0.888	1.256

Unless the same level of CROP

1 and 2				1.034		
0 v 1 or 2				0.895		

Unless same level of PHORATE

1 and 2					1.034	
0 v 1 or 2					0.895	

Unless same level of CROP and PHORATE

1 and 2						1.462
0 v 1 or 2						1.266

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72/R/M/5

NO. OF SALEABLE COBS: THOUS/HECTARE

PHORATE: KG/HA DIMETHOATE SPRAY (DS)

	0	1.68	0*	1	2	Mean
CROP						
Grain Maize	31.4	36.3	35.0	34.1	31.4	33.9
Sweet Corn	19.7	20.6	17.9	19.7	25.1	20.2
PHORATE: KG/HA						
0			26.5	25.1	24.2	25.6
1.68			26.5	28.7	32.3	28.5
Mean			26.5	26.9	28.3	27.0

PHORATE: KG/HA	0			1.68		
DIMETHOATE SPRAY (DS)	0	1	2	0	1	2
CROP						
Grain Maize	34.1	31.4	26.0	35.9	36.8	36.8
Sweet Corn	18.8	18.8	22.4	17.0	20.6	27.8

* Duplicated treatment

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STANDARD ERRORS OF DIFFERENCES

NO. OF SALEABLE COBS: THOUS/HECTARE

CROP	PHORATE	DS	CROP PHORATE	CROP DS	PHORATE DS	CROP PHORATE DS
3.33	3.33		4.70			
1 and 2		3.57		5.49	5.49	7.76
0 v 1 or 2		3.09		4.88	4.88	6.90
0				4.17	4.17	5.90

Unless the same level of CROP

1 and 2	5.04
0 v 1 or 2	4.37

Unless the same level of PHORATE

1 and 2	5.04
0 v 1 or 2	4.37

Unless the same level of CROP and PHORATE

1 and 2	7.13
0 v 1 or 2	6.18

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72/E/1

METEOROLOGICAL RECORDS 1972 - 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. 0.000405 HA (1/1000 acre) gauge	Rain(3) days	Drainage through 50.8 cm (20 in.) soil:mm.	Wind(4) miles per hour
Jan	43.8 (-8.0)	3.1 (+0.2)	1.5	4.9	6.9	17	84 (+20)	21	75.7	5.8
Feb	30.2 (-38.1)	3.9 (+0.5)	2.4	4.0	5.4	15	67 (+19)	17	58.4	5.6
Mar	149.3 (+33.6)	6.4 (+1.2)	3.0	5.7	5.9	20	69 (+21)	17	36.6	6.2
Apl	109.3 (-42.6)	8.0 (+0.3)	4.2	8.3	7.6	10	55 (+6)	18	24.1	7.9
May	165.5 (-28.9)	10.5 (-0.6)	7.0	10.6	9.2	3	45 (-9)	22	3.5	6.8
June	160.3 (-41.8)	11.7 (-2.4)	8.2	12.7	11.0	0	38 (-18)	17	TR	4.5
July	158.4 (-32.7)	15.5 (-0.4)	11.9	15.0	12.9	0	29 (-35)	10	TR	3.9
Aug	165.5 (-13.6)	15.1 (-0.5)	11.5	15.2	14.0	0	37 (-28)	5	12.2	3.9
Sept	123.9 (-20.4)	11.7 (-1.7)	8.1	12.9	13.3	2	32 (-28)	5	TR	4.0
Oct	102.1 (-1.2)	10.5 (+0.9)	7.5	10.7	11.6	9	30 (-44)	6	8.9	5.3
Nov	86.2 (+25.3)	5.7 (-0.1)	3.5	7.8	9.9	16	68 (-3)	17	46.2	6.2
Dec	44.6 (-0.1)	5.1 (+1.5)	3.8	6.3	7.8	21	93 (+26)	14	88.4	5.4
Year*	1339.1 (-168.5)	8.9 (-0.1)	6.1	9.5	9.6	113	647 (-73)	169	354.0	5.4

(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 1972 - 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	42.7 (-8.6)	3.5 (+0.4)	1.8	4.9	7.3	14	59.1 (+4.7)	20	5.3
Feb	36.3 (-30.4)	4.1 (+0.8)	2.7	4.1	6.0	15	38.1 (-1.3)	16	4.9
Mar	141.1 (+24.1)	6.5 (+1.1)	3.3	5.9	6.4	20	42.6 (+0.6)	16	5.4
Apl	103.3 (-40.5)	8.1 (0.0)	4.0	8.5	7.9	5	48.5 (+3.0)	18	6.9
May	149.1 (-35.8)	10.5 (-0.6)	6.4	11.1	9.4	2	39.9 (-13.9)	20	6.3
June	156.3 (-41.7)	11.9 (-2.4)	7.9	13.3	11.3	1	27.3 (-23.0)	12	5.3
July	138.1 (-43.2)	15.3 (-0.8)	11.8	15.8	13.1	0	67.5 (+11.5)	13	4.0
Aug	157.8 (-13.1)	15.0 (-0.8)	11.5	15.9	14.3	0	15.2 (-47.5)	4	4.0
Sept	113.2 (-22.1)	11.4 (-2.3)	8.2	13.3	13.7	4	35.7 (-15.7)	6	3.1
Oct	94.6 (-8.1)	10.1 (0.0)	7.8	10.9	12.1	10	21.8 (-32.8)	8	4.0
Nov	78.9 (+19.3)	6.0 (-0.3)	3.4	7.8	10.4	15	51.7 (-12.8)	13	6.5
Dec	48.4 (+4.2)	5.3 (+1.4)	3.6	6.3	8.3	16	46.3 (-6.0)	14	5.5
Year*	1259.8 (-195.9)	9.0 (-0.3)	6.0	9.8	10.0	102	493.7(-133.2)	160	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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72/E/1

METEOROLOGICAL RECORDS 1972 - 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	3.7	1.7	4.3	13	62	10	6.8
Feb	4.3	2.8	4.1	10	32	9	6.0
Mar	6.5	3.9	5.6	17	31	8	7.2
Apl	8.0	4.4	8.3	4	45	16	8.4
May	10.7	7.2	11.3	1	39	15	7.3
June	12.3	10.0	13.2	0	44	12	5.4
July	15.7	11.7	17.4	0	51	8	3.8
Aug	15.3	11.1	15.9	0	10	4	4.7
Sept	11.9	8.9	13.0	0	66	7	4.3
Oct	10.5	7.8	10.9	5	6	4	5.7
Nov	5.8	3.9	6.9	7	49	12	7.4
Dec	5.7	4.4	5.9	6	30	10	6.9
Year*	9.2	6.5	9.7	63	465	115	6.2

(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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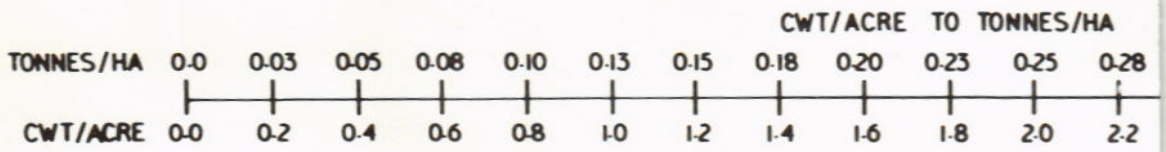
CONVERSION FACTORS

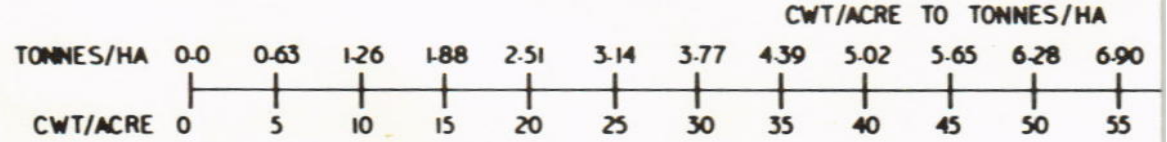
Factors for the Conversion of Imperial to Metric Units

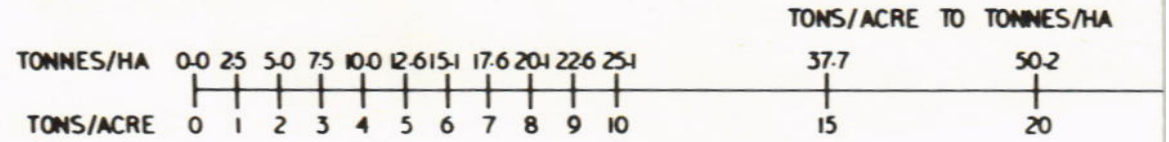
1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (sq yd)	= 0·8361 sq m
1 acre (=4840 sq yd)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 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

CONVERSION SCALES







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