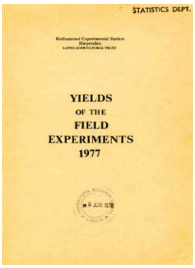
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1977

Full Table of Content

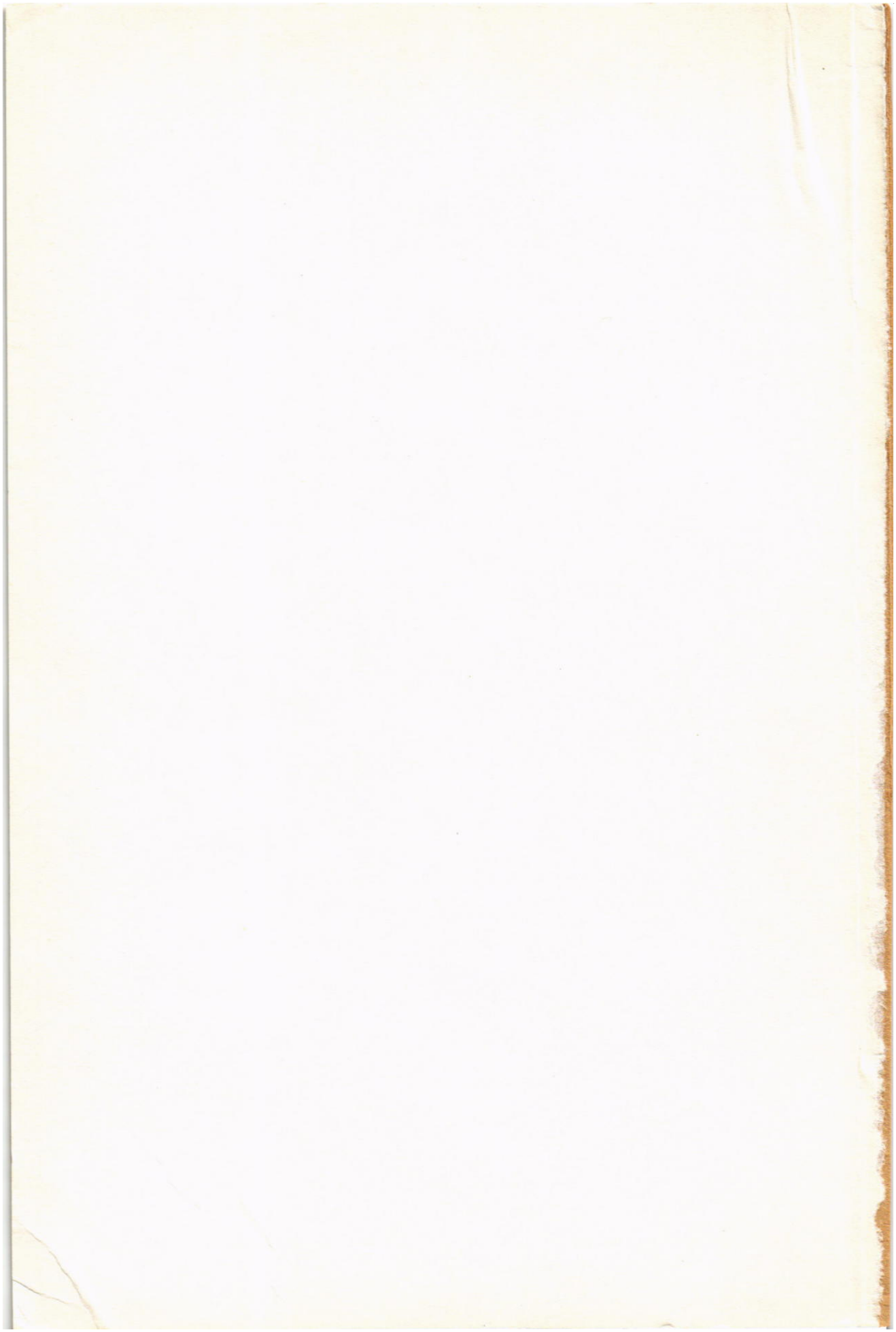


Default Title

Rothamsted Research

Rothamsted Research (1978) *Default Title ;* Yields Of The Field Experiments 1977, pp 0 - 413 **- DOI: https://doi.org/10.23637/ERADOC-1-29**

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

YIELDS

of the

FIELD

EXPERIMENTS

1977

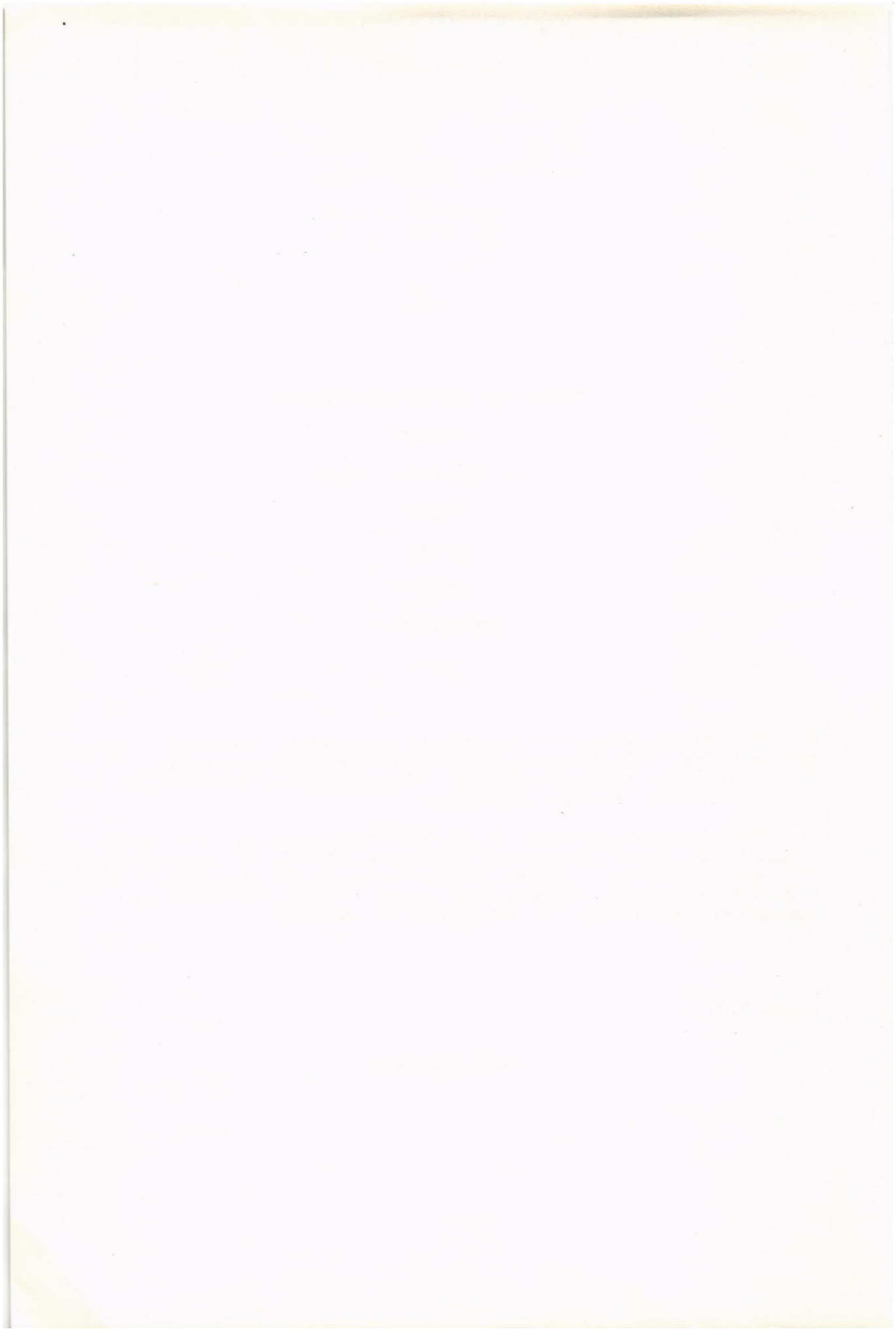
This report includes only experiments conducted at Rothamsted, Woburn and Saxmundham. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

The design and supervision of the field experiments are the responsibility of the Field Plots Committee (members in 1977: F.G.W. Jones (Chairman), G.V. Dyke (Secretary), J. McEwen (Deputy Secretary), J.P. Dickinson, L. Fowden, I.J. Graham-Bryce, A.E. Johnston, E.J. Lester, T. Lewis, R. Moffitt, J.A. Nelder, P.B. Tinker, C.P. Whittingham, T. Woodhead).

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CONVENTIONS 1977

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

For each experiment, other than annuals, references are given to previous years. These refer to the '(Numerical)(Results) Yields of the Field Experiments' - (t) indicates a year when treatments were described. Since 1973 treatments have been described annually for all experiments and (t) is not used for these years.

For the classical and some long-term experiments reference is made to 'Details' - separate publications, giving full descriptions of treatments until 1967 & 1973, with full titles 'Details of the Classical and Long Term Experiments up to 1967' and 'Details of the Classical and Long Term Experiments up to 1973'.

The following conventions are observed unless otherwise stated.

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

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

All yields and plant numbers are per hectare.

The following abbreviations are used in variate headings:

Wheat, barley, oats, rye, beans etc.

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

Sugar beet

Roots:	Roots (washed)
Sugar %:	Sugar percentage

All crops

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

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

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

Compound fertilisers indicated thus - (20:10:10) = compound fertiliser (20% N, 10% P205, 10% K20), granular unless otherwise stated.

The compound fertiliser (13:13:20) used in our experiments is the grade containing sulphate of potash.

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

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Harvest areas for cereals

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

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

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

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

A series of experiments by Widdowson at Rothamsted (68/Da/9, 68/Db/1, 69/R/W/13, 69/R/B/5, 70/R/WW/3) showed that on average the yield of 16 rows (50 ft (15 m) long) was 7.8% greater with blank rows than without.

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

width of cutter bar x length of rows.

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

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

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

Tables of means

Tables of means are presented directly from computer output. Both factor and level names are present in upper case characters. Vertical and horizontal lines are omitted e.g.:-

FACTOR C	LEVEL C1		LEVEL C2		LEVEL C3	
FACTOR B	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2
FACTOR A						
LEVEL A1	*	*	*	*	*	*
LEVEL A2	*	*	*	*	*	*

Standard errors

NOTES: (1) This report gives standard errors of differences, not of means.

(2) Annotations (e.g. *, min rep, max-min, max rep) to S.E.Ds are only explained the first time they occur in any experiment.

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77/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 134th year, wheat, potatoes, beans. The tenth year of the revised scheme.

For previous years see 'Details' 1967 & 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-76/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	3, 4 and 5	0.00659
	8 and 9	0.00694
Potatoes:	7	0.00659
Beans:	2	0.00741

Treatments:

Whole plots

PLOT	Plot	Fertilisers and organic manures:- Treatments until 1967	Treatments from 1968
01DN2PK	01	-	D N2 P K
21DN2	21	D	D N2
22D	22	D	D
030	03	None	None
05MIN	05	P K Na Mg	P K (Na) Mg
06N1MIN	06	N1 P K Na Mg	N1 P K (Na) Mg
07N2MIN	07	N2 P K Na Mg	N2 P K (Na) Mg
08N3MIN	08	N3 P K Na Mg	N3 P K (Na) Mg
09N4MIN	09	N*1 P K Na Mg	N4 P K (Na) Mg
10N2	10	N2	N2
11N2P	11	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg
15N3MIN	15	N2 P K Na Mg	N3 P K (Na) Mg
16N2MIN	16	N*2 P K Na Mg	N2 P K (Na) Mg
17N2MINH	17	+N2	N2 1/2(P K (Na) Mg)
18N2MINH	18	+ P K Na Mg	N2 1/2(P K (Na) Mg)
19C	19	C	C
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg

+ Alternating

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77/R/BK/1

N1,N2,N3,N4: 48, 96, 144, 192 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' from 1968).
P: 35 kg P as single superphosphate (triple superphosphate in 1974)
K: 90 kg K as sulphate of potash
Na: 55 kg Na as sulphate of soda
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 30 kg Mg annually to Plot 14, 35 kg Mg every third year to other plots since 1974. All as kierserite since 1974, previously as sulphate of magnesia annually
D: Farmyard manure at 35 tonnes
C: Castor meal to supply 96 kg N
MIN: P K (Na) Mg

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing on strips of sub-plots. From 1968, ten sub-plots were started with the following cropping:-

SECTION		1968	69	70	71	72	73	74	75	76	77
SC0/W26	Section 0	W (last fallowed 1951)	W	W	W	W	W	W	W	W	W
SC1/W11	Section 1	W (last fallowed 1966)	W	W	W	W	W	W	W	W	W
BEANS	Section 2	BE	W	P	BE	W	P	BE	W	P	BE
SC3/W1F	Section 3	W (fallowed 1967)	W	F	W	W	F	W	W	F	W
SC4/W1BE	Section 4	W (fallowed 1965)	P	BE	W	P	BE	W	P	BE	W
SC5/W2F	Section 5	W (fallowed 1965)	F	W	W	F	W	W	F	W	W
-	Section 6	F	W	W	F	W	W	F	W	W	F
POTATOES	Section 7	P	BE	W	P	BE	W	P	BE	W	P
SC8/W5	Section 8*	W (fallowed 1963)	W	W	W	F	W	W	W	W	W
SC9/W19	Section 9	W (last fallowed 1958)	W	W	W	W	W	W	W	W	W

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

* No weedkillers

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

Standard applications:
Winter wheat: Manures: Sections 8 and 9: Chalk at 2.9 t. Weedkillers: Section 4: Diquat at 0.59 kg ion in 450 l. Sections 0, 1 and 9: Glyphosate at 1.7 kg in 220 l. Sections 0, 1, 3, 4, 5 and 9: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 220 l applied in spring. Insecticide: Pirimicarb at 0.14 kg in 280 l.
Potatoes: Manures: Chalk at 2.9 t. Weedkillers: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 340 l. Fungicide: Mancozeb at 1.3 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg applied with the fungicide.
Beans: Insecticide: Pirimicarb at 0.14 kg in 280 l.
Fallow: Chalk at 2.9 t.

Seed: Wheat: Cappelle, dressed with chlorfenvinphos, sown at 200 kg.
Potatoes: Pentland Crown.
Spring beans: Minden sown at 220 kg.

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77/R/BK/1

Cultivations, etc.:-

ALL SECTIONS: Superphosphate, sulphate of potash applied: 5 Oct, 1976. Sulphate of soda, kieserite, castor meal applied: 8 Oct. FYM applied: 11 Oct. Ploughed: 11-13 Oct.

CROPPED SECTIONS:

Winter wheat: Diquat applied: 6 Aug. Glyphosate applied: 6 Sept. Chalk applied: 7 Sept. Sections 8 and 9 rotary harrowed: 3 Nov. Sections 0 and 1 rotary harrowed: 4 Nov. Sections 3, 4 and 5 heavy spring-tine cultivated: 4 Nov. Sections 3, 4 and 5 rotary harrowed: 22 Nov. Seed sown, spring-tine cultivated: 24 Nov. N applied: 18 Apr, 1977. Spring weedkillers applied to Sections 3, 4, 5 and 9: 10 May. Spring weedkillers applied to Sections 0 and 1: 23 May. Insecticide applied: 12 July. Combine harvested: 8 Sept.

Potatoes: Chalk applied: 6 Sept, 1976. Spring-tine cultivated and N applied: 18 Apr, 1977. Spike rotary cultivated and potatoes machine planted: 19 Apr. Grubbed: 21 Apr, 21 June. Weedkillers applied: 23 May. FYM plots rotary ridged: 22 June. Fungicide applied: 23 June, 5 July. Remaining plots grubbed and rotary ridged: 30 June. Fungicide with insecticide applied: 26 July, 10 Aug. Lifted: 14 Sept.

Spring beans: N applied: 7 Mar. Rotary harrowed: 9 Mar. Seed sown: 10 Mar. Tractor hoed: 18 May. Insecticide applied: 19 July. Combine harvested: 15 Sept.

FALLOW SECTION: Chalk applied: 6 Sept, 1976. Spring-tine cultivated: 29 Apr, 11 Aug. Ploughed: 25 May, 20 July.

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77/R/BK/1

WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	SC4/W1BE	SC3W1F	SC5/W2F	SC1/W11	SC9/W19	SC0/W26	SC8/W5	MEAN
01DN2PK	5.68	4.17	7.26	*	*	*	*	5.70
21DN2	5.78	5.89	6.03	3.92	4.62	3.20	3.84	4.75
22D	5.16	4.58	5.97	5.38	5.88	5.17	4.64	5.25
030	2.54	2.27	1.78	1.64	1.94	1.79	2.00	1.99
05MIN	2.99	2.92	1.69	1.24	1.38	2.50	2.57	2.18
06N1MIN	4.40	2.84	3.41	2.98	2.53	2.78	3.02	3.14
07N2MIN	5.57	4.03	5.51	4.23	3.94	4.69	4.09	4.58
08N3MIN	5.58	4.67	4.78	4.99	5.42	4.73	4.50	4.95
09N4MIN	5.77	3.27	5.33	4.96	4.01	4.96	4.73	4.72
10N2	4.98	2.20	0.78	3.63	3.07	2.86	3.86	3.05
11N2P	5.46	1.99	3.27	2.19	1.14	3.49	2.45	2.86
12N2PNA	5.12	1.85	3.84	3.75	1.88	3.79	2.87	3.30
13N2PK	5.44	2.35	5.00	4.44	2.84	4.28	2.91	3.89
14N2PKMG	6.12	2.95	5.15	4.42	3.11	4.03	3.25	4.15
15N3MIN	5.47	2.87	5.70	4.89	4.16	4.42	4.43	4.56
16N2MIN	5.87	2.99	4.64	4.27	3.70	4.15	4.10	4.25
17N2MINH	6.00	3.89	5.49	4.35	2.73	5.20	4.23	4.56
18N2MINH	5.90	4.16	5.10	4.62	3.89	4.49	3.10	4.47
19C	5.17	4.41	4.33	4.03	2.72	4.20	2.99	3.98
20NKMG	*	*	*	4.87	*	4.37	*	4.62

GRAIN MEAN DM% 81.3

STRAW TONNES/HECTARE

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

SECTION PLOT	SC4/W1BE	SC3W1F	SC5/W2F	SC1/W11	SC9/W19	SC0/W26	SC8/W5	MEAN
01DN2PK	4.93	4.39	5.55	*	*	*	*	4.96
21DN2	5.26	5.55	5.03	5.83	5.17	5.89	5.00	5.39
22D	4.22	3.67	4.44	4.13	3.79	4.16	4.08	4.07
030	1.34	0.89	0.90	1.23	1.01	1.26	1.07	1.10
05MIN	1.18	1.25	0.73	1.23	0.92	1.64	2.60	1.36
06N1MIN	3.96	2.66	2.47	3.15	2.38	2.86	2.83	2.90
07N2MIN	4.94	4.36	4.60	3.49	3.64	4.69	4.21	4.27
08N3MIN	4.69	4.57	3.41	4.22	4.64	4.06	5.06	4.38
09N4MIN	4.65	3.73	3.54	4.21	4.07	4.56	4.63	4.20
10N2	2.51	2.06	1.45	2.05	1.64	2.23	2.87	2.12
11N2P	2.95	2.34	1.75	2.03	1.80	2.46	2.64	2.28
12N2PNA	2.84	2.31	2.22	2.64	2.11	3.25	2.73	2.59
13N2PK	3.98	3.20	3.22	4.48	3.38	4.48	3.80	3.79
14N2PKMG	3.99	3.25	3.89	4.57	3.34	4.98	3.34	3.91
15N3MIN	4.19	3.87	4.18	4.04	4.44	4.06	4.47	4.18
16N2MIN	4.29	3.83	3.58	4.27	4.49	4.29	4.81	4.22
17N2MINH	4.94	4.15	3.91	4.47	3.89	4.39	4.93	4.38
18N2MINH	4.61	4.48	4.39	4.15	4.68	5.04	4.72	4.58
19C	3.24	2.79	2.23	2.77	1.99	2.75	3.01	2.68
20NKMG	*	*	*	3.02	*	2.89	*	2.96

STRAW MEAN DM% 88.2

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77/R/BK/1

PLOT	POTATOES TOTAL TUBERS TONNES/ HECTARE	POTATOES % WARE 3.81 CM (1.5 INCH) RIDDLE	SPRING BEANS GRAIN TONNES/ HECTARE	SPRING BEANS STRAW TONNES/ HECTARE
01DN2PK	25.0	90.0	3.17	3.73
21DN2	30.2	92.6	3.04	3.39
22D	26.9	92.4	3.34	3.74
030	7.0	88.4	2.38	1.18
05MIN	8.8	81.5	3.87	2.94
06N1MIN	14.6	84.9	3.45	3.25
07N2MIN	19.3	88.5	3.26	3.44
08N3MIN	26.1	92.8	3.52	3.60
09N4MIN	34.9	94.1	3.81	3.27
10N2	6.4	83.3	1.41	0.36
11N2P	4.3	43.3	0.63	1.66
12N2PNA	5.0	56.8	0.56	1.26
13N2PK	14.8	75.3	2.68	3.09
14N2PKMG	20.1	88.5	2.77	1.99
15N3MIN	28.6	94.8	2.81	3.24
16N2MIN	24.0	90.8	2.95	2.69
17N2MINH	20.7	92.7	2.82	2.62
18N2MINH	23.0	90.0	2.76	2.52
19C	17.8	87.4	2.43	1.91
MEAN DM%			81.7	89.0

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77/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 126th year, barley, potatoes and beans. The tenth year of revised scheme.

For previous years see 'Details' 1967 & 1973, Station Report for 1966, and 74-76/R/HB/2.

Treatments to barley: All combinations of:-

1. MANURE Fertilisers, organic manures and frequency of barley cropping:-

	Form of N 1852-1966	Additional treatments 1852-1977	
---CON	None	-	Continuous
-P-CON	None	P	Continuous
--KCON	None	K (Na) Mg	Continuous
-PKCON	None	P K (Na) Mg	Continuous
A--CON	A	-	Continuous
AP-CON	A	P	Continuous
A-KCON	A	K (Na) Mg	Continuous
APKCON	A	P K (Na) Mg	Continuous
N--CON	N	-	Continuous
N--SICON	N	- Si	Continuous
NP-CON	N	P	Continuous
NP-SICON	N	P Si	Continuous
N-KCON	N	K (Na) Mg	Continuous
N-KSICON	N	K (Na) Mg Si	Continuous
NPKCON	N	P K (Na) Mg	Continuous
NPKSICON	N	P K (Na) Mg Si	Continuous
C--CON	C	-	Continuous
C--RTN	C	-	In rotation (P,BE,B)
CP-CON	C	P	Continuous
CP-RTN	C	P	In rotation (P,BE,B)
C-KCON	C	K (Na) Mg	Continuous
C-KRTN	C	K (Na) Mg	In rotation (P,BE,B)
CPKCON	C	P K (Na) Mg	Continuous
CPKRTN	C	P K (Na) Mg	In rotation (P,BE,B)
DCON	None	D	Continuous
(D)CON	(D)	-	Continuous
(A)CON	(Ashes)	-	Continuous
-CON	None	-	Continuous

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N. C, castor meal to supply 96 kg N.
P: 35 kg P as single superphosphate (triple superphosphate in 1974).
K: 90 kg K as sulphate of potash.
(Na): 16 kg Na as sulphate of soda until 1973.
Mg: 35 kg Mg, as kieserite every third year, since 1974 (sulphate of magnesia annually until 1973).
Si: Silicate of soda at 450 kg.
D: Farmyard manure at 35 tonnes. (D): until 1871 only.
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932. None since.

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

0
48
96
144

There are four extra plots testing all combinations of:-

1. MANURE Fertilisers other than magnesium:

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

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

2. MGNESIUM Magnesium fertiliser (kg Mg) as kieserite every third year since 1974:

0
35

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

1. MANURE Fertiliser and organic manures:

	To potatoes and beans: 1852-1966	1852-1977
C---	C	-
CP--	C	P
C-KMG	C	K (Na) Mg
CPKMG	C	P K (Na) Mg
	To potatoes only:	
N----	N	-
N---SI	N	Si
NP---	N	P
NP--SI	N	P Si
N-KMG-	N	K (Na) Mg
N-KMGSI	N	K (Na) Mg Si
NPKMG	N	P K (Na) Mg
NPKMGSI	N	P K (Na) Mg Si

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77/R/HB/2

2. NRES(76) N Nitrogen fertiliser (kg N), as 'Nitro-Chalk':

Beans	Potatoes	Beans (residual effects, applied to previous potatoes)	Potatoes (applied 1977)
0	0		
96	96		
192	192		
288	288		

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

Standard applications:
Barley: Weedkillers: Diquat at 0.59 kg ion in 450 l applied in autumn, (to MANURE C--RTN, CP-RTN, C-KRTN and CPKRTN plots only). Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l) applied in spring.
Potatoes: Manures: Chalk at 2.9 t. Weedkiller: Linuron at 1.2 kg in 340 l. Fungicide: Mancozeb at 1.3 kg in 340 l applied on four occasions. Insecticide: Pirimicarb at 0.14 kg applied with the last two fungicide sprays.
Beans: Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Barley: Julia, dressed ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.
Beans: Minden, sown at 220 kg.

Cultivations, etc.:-
All plots: P, K, Mg and silicate of soda applied: 25 Oct, 1976. FYM applied: 26 Oct. Ploughed: 28 Oct. Spring-tine cultivated: 7 Mar, 1977.
Barley: Autumn weedkiller applied: 6 Aug, 1976. Seed sown: 8 Mar, 1977. N applied: 14 Apr. Spring weedkillers applied: 24 May. Combine harvested: 23 Aug.
Potatoes: Chalk applied: 6 Sept, 1976. N applied: 14 Apr, 1977. Spike rotary cultivated, potatoes planted: 19 Apr. Grubbed twice: 21 Apr, 21 June. Rotary ridged twice: 26 May, 22 June. Weedkiller applied: 28 May. Fungicide applied: 23 June, 5 July. Fungicide with insecticide applied: 26 July, 10 Aug. Haulm mechanically destroyed: 3 Oct. Lifted: 3 Nov.
Beans: Seed sown: 9 Mar. Tractor hoed: 18 May. Insecticide applied: 19 July. Combine harvested: 21 Sept.

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77/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---CON	1.69	2.68	2.75	2.77	2.47
-P-CON	1.99	3.56	4.83	4.81	3.80
-KCON	1.78	3.03	3.75	4.24	3.20
-PKCON	1.80	4.57	5.32	5.84	4.38
A--CON	1.68	2.00	2.72	2.82	2.31
AP-CON	2.33	3.31	3.42	2.87	2.98
A-KCON	1.72	2.73	3.20	3.31	2.74
APKCON	2.28	4.38	5.62	5.98	4.56
N--CON	1.75	2.52	2.99	2.68	2.48
N--SICON	2.44	3.76	3.92	4.36	3.62
NP-CON	2.61	4.06	4.29	4.22	3.79
NP-SICON	2.54	4.48	5.74	5.65	4.60
N-KCON	1.94	2.76	3.16	3.66	2.88
N-KSICON	2.09	3.78	5.19	4.75	3.95
NPKCON	2.07	4.64	5.28	6.02	4.50
NPKSICON	2.07	4.35	5.38	5.68	4.37
C--CON	2.30	4.31	5.09	5.39	4.27
C--RTN	2.19	4.44	5.20	5.26	4.27
CP-CON	2.58	4.87	5.77	5.16	4.59
CP-RTN	2.73	4.88	5.77	5.86	4.81
C-KCON	2.43	3.81	4.99	4.79	4.01
C-KRTN	2.15	3.99	4.49	4.54	3.79
CPKCON	2.51	4.61	5.83	5.72	4.67
CPKRTN	3.60	5.00	5.97	6.09	5.16
DCON	5.22	6.11	6.52	5.96	5.95
(D)CON	2.63	4.21	4.59	4.68	4.02
(A)CON	2.12	3.73	3.99	4.84	3.67
-CON	1.97	3.20	3.27	3.42	2.96
MEAN	2.33	3.92	4.61	4.69	3.89

GRAIN MEAN DM% 77.6

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77/R/HB/2

BARLEY

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---CON	0.61	0.99	1.19	1.38	1.04
-P-CON	0.61	1.19	2.40	2.19	1.60
-KCON	0.59	1.78	1.97	2.38	1.68
-PKCON	0.79	2.78	3.21	3.43	2.55
A--CON	0.39	0.59	0.98	0.98	0.74
AP-CON	0.40	1.00	1.19	1.20	0.95
A-KCON	0.79	0.98	1.78	1.58	1.28
APKCON	0.79	2.41	3.79	3.55	2.64
N--CON	0.36	0.72	1.09	0.72	0.73
N--SICON	0.73	1.10	1.82	1.80	1.36
NP-CON	0.73	1.45	1.45	1.41	1.26
NP-SICON	0.73	1.47	2.92	2.18	1.83
N-KCON	0.72	1.80	1.07	1.80	1.35
N-KSICON	0.72	1.46	2.91	2.53	1.90
NPKCON	0.36	2.19	2.84	2.90	2.07
NPKSICON	0.72	2.19	2.91	3.66	2.37
C--CON	0.37	1.46	2.19	2.19	1.55
C--RTN	0.74	2.22	2.94	2.19	2.02
CP-CON	0.73	1.83	2.54	2.20	1.83
CP-RTN	0.75	2.22	2.19	3.35	2.13
C-KCON	0.73	1.83	2.94	2.59	2.02
C-KRTN	0.73	1.81	2.94	2.93	2.10
CPKCON	0.73	2.58	3.30	3.60	2.55
CPKRTN	1.47	3.29	3.69	4.44	3.22
DCON	3.41	4.46	5.08	4.28	4.31
(D)CON	1.07	2.40	2.67	2.93	2.26
(A)CON	0.80	1.60	1.87	2.41	1.67
-CON	0.78	1.58	2.35	1.56	1.57
MEAN	0.80	1.83	2.44	2.44	1.88

STRAW MEAN DM% 88.2

SUB PLOT AREA HARVESTED 0.00007

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77/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

MANURE MGNESIUM	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
0	5.24	0.91	4.38	2.49	3.25
35	5.61	1.21	3.94	2.65	3.35
MEAN	5.42	1.06	4.16	2.57	3.30

GRAIN MEAN DM% 77.5

STRAW TONNES/HECTARE

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

MANURE MGNESIUM	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
0	3.57	0.17	2.03	0.99	1.69
35	3.52	0.33	1.84	1.01	1.68
MEAN	3.55	0.25	1.93	1.00	1.68

STRAW MEAN DM% 87.0

SUB PLOT AREA HARVESTED 0.00306

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77/R/HB/2

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

N MANURE	0	96	192	288	MEAN
C---	9.8	12.5	12.2	13.9	12.1
CP--	10.7	13.4	10.8	12.3	11.8
C-KMG	15.3	28.9	28.2	33.4	26.4
CPKMG	21.6	31.4	43.7	48.8	36.4
N----	8.0	7.1	6.1	7.6	7.2
N---SI	7.9	7.0	8.2	7.2	7.6
NP---	6.7	8.1	9.0	6.1	7.5
NP--SI	6.7	7.1	7.3	7.1	7.1
N-KMG-	11.7	19.2	22.8	18.7	18.1
N-KMGSI	15.1	24.7	26.9	27.4	23.5
NPKMG	20.6	32.0	44.7	46.0	35.8
NPKMGSI	14.3	34.5	43.9	52.6	36.3
MEAN	12.4	18.8	22.0	23.4	19.2

PERCENTAGE WARE 3.81 CM (1.5 INCH RIDDLE)

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

N MANURE	0	96	192	288	MEAN
C---	87.2	91.2	89.7	90.2	89.6
CP--	80.0	81.2	77.7	72.3	77.8
C-KMG	91.8	94.7	96.2	98.4	95.2
CPKMG	89.1	91.5	96.2	94.1	92.7
N----	89.5	86.0	87.9	86.9	87.6
N---SI	89.3	81.3	91.1	86.2	87.0
NP---	75.0	66.5	75.4	72.4	72.3
NP--SI	68.7	65.4	65.5	72.1	67.9
N-KMG-	92.4	97.0	97.0	96.9	95.8
N-KMGSI	95.5	97.9	98.0	97.5	97.2
NPKMG	91.9	94.4	96.0	95.2	94.4
NPKMGSI	80.2	91.9	92.9	96.0	90.3
MEAN	85.9	86.6	88.6	88.2	87.3

PLOT AREA HARVESTED 0.00191

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77/R/HB/2

BEANS

GRAIN TONNES/HECTARE

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

MANURE NRES(76)	C---	CP--	C-KMG	CPKMG	MEAN
0	1.62	1.07	1.82	2.78	1.82
96	1.61	0.98	1.30	3.07	1.74
192	1.82	1.29	2.24	3.07	2.10
288	2.13	1.20	2.11	2.60	2.01
MEAN	1.79	1.14	1.87	2.88	1.92

GRAIN MEAN DM% 79.9

STRAW TONNES/HECTARE

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

MANURE NRES(76)	C---	CP--	C-KMG	CPKMG	MEAN
0	1.10	1.94	3.07	2.92	2.26
96	0.82	2.14	2.62	3.38	2.24
192	1.64	2.73	2.48	2.36	2.30
288	1.43	3.10	3.33	3.27	2.78
MEAN	1.25	2.48	2.88	2.98	2.40

STRAW MEAN DM% 55.8

SUB PLOT AREA HARVESTED 0.00143

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77/R/WF/3

WHEAT AND FALLOW

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

The 122nd year, winter wheat.

For previous years see 'Details' 1967, 1973 and 74-76/R/WF/3.

Whole plot dimensions: 9.60 x 52.1.

Treatments:

PLOT	Phase of fallowing cycle (up to 1977):-							
-	Plot 1	W	F	F	F	W	F	W	F
-	Plot 2	F	W	F	W	F	W	F	F
-	Plot 3	W	F	W	F	F	F	W	F
4/FALL1	Plot 4	F	F	F	W	F	W	F	W
-	Plot 5	W	F	W	F	W	F	F	F
6/FALL1	Plot 6	F	W	F	F	F	W	F	W
-	Plot 7	F	F	W	F	W	F	W	F
8/FALL3	Plot 8	F	W	F	W	F	F	F	W

W = wheat, F = fallow.

Basal applications: Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.:-
Wheat plots: Ploughed: 1 Oct, 1976. Rotary harrowed and seed sown: 24 Nov. Weedkillers applied: 24 May, 1977. Insecticide applied: 15 July. Combine harvested: 8 Sept.
Fallow plots: Ploughed: 1 Oct, 1976, 18 May, 1977 and 20 July. Spring-tine cultivated: 11 Aug.

GRAIN TONNES/HECTARE

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

PLOT	4/FALL1	6/FALL1	8/FALL3	MEAN
	1.95	2.09	2.49	2.17

GRAIN MEAN DM% 81.1

STRAW TONNES/HECTARE

PLOT	4/FALL1	6/FALL1	8/FALL3	MEAN
	1.21	1.18	1.24	1.21

STRAW MEAN DM% 89.7

PLOT AREA HARVESTED 0.01483

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77/R/EX/4

EXHAUSTION LAND

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

The 122nd year, barley.

For previous years see 'Details' 1967, 1973 and 74-76/R/EX/4.

Treatments: All combinations of:-

Whole plots

1. PLOTFERT(01) Fertiliser and farmyard manure 1876-1901:

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

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

Sub plots

2. N Nitrogen fertiliser (kg N) (basal until 1975, on a cyclic system since 1976)
0
48
96
144

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

Basal applications: Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Ploughed: 4 Oct, 1976. Rotary harrowed and seed sown: 9 Mar, 1977. N applied: 2 May. Weedkillers applied: 24 May. Combine harvested: 26 Aug.

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77/R/EX/4

GRAIN TONNES/HECTARE

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

N PLOTFERT(01)	0	48	96	144	MEAN
1-	1.72	2.17	2.52	3.37	2.45
2-	1.43	2.20	2.31	2.30	2.06
3D	2.71	4.35	5.36	4.69	4.28
4D	2.52	4.52	5.75	4.24	4.26
5N	1.81	2.51	2.56	3.36	2.56
6N*	1.83	2.14	2.03	1.99	2.00
7NMIN	2.17	3.50	4.68	3.69	3.51
8N*MIN	2.23	3.54	4.61	4.59	3.74
9P	2.57	3.77	4.73	5.17	4.06
10MIN	1.79	3.50	3.75	4.55	3.40
MEAN	2.08	3.22	3.83	3.79	3.23

GRAIN MEAN DM% 76.7

STRAW TONNES/HECTARE

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

N PLOTFERT(01)	0	48	96	144	MEAN
1-	0.70	1.18	1.32	1.60	1.20
2-	0.48	1.10	1.45	1.30	1.08
3D	1.10	2.41	3.06	3.04	2.40
4D	1.02	2.61	3.08	3.31	2.51
5N	0.68	1.24	1.32	1.45	1.17
6N*	0.82	1.02	1.17	0.97	1.00
7NMIN	0.91	1.96	2.78	2.86	2.13
8N*MIN	0.82	2.17	2.62	2.78	2.10
9P	0.95	1.84	2.71	2.73	2.06
10MIN	0.69	1.92	2.49	2.72	1.96
MEAN	0.82	1.75	2.20	2.28	1.76

STRAW MEAN DM% 85.6

PLOT AREA HARVESTED 0.00728

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77/R/PG/5

PARK GRASS

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

The 122nd year, hay.

For previous years see 'Details' 1967 and 1973 and 74-76/R/PG/5.

Treatments:

Whole plots

MANURE	Fertilisers and organic manures:-	
N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
N1MIN	Plot 6	N1 P K Na Mg
MIN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
N2MIN	Plot 9	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MIN	Plot 11-1	N3 P K Na Mg
N3MINSI	Plot 11-2	N3 P K Na Mg Si
O/PLOT12	Plot 12	None
D/F	Plot 13	D/F
N2*MIN	Plot 14	N2* P K Na Mg
MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MIN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20 in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20 in years with no farmyard manure) as single superphosphate (triple superphosphate in 1974)
K:	225 kg K (45 kg K to Plot 20 in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MIN:	P K Na Mg

Sub plots

LIME	Liming:-
A	a Ground chalk applied as necessary to achieve pH7
B	b Ground chalk applied as necessary to achieve pH6
C	c Ground chalk applied as necessary to achieve pH5
D	d None

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77/R/PG/5

NOTE: Lime was applied regularly, and at the same rate, to all a and b sub plots of Plots 1 to 17 (except 12) from 1924. Differential liming started in 1965 on certain b and c sub plots (except on Plot 12) and in 1976 on certain a sub plots (including Plot 12) and 12b.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes $CaCO_3$ applied every fourth year 1920-1964):-

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
D0	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. The remaining sub-plots of Plots 18, 19 and 20 are treated as 'a'.

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

Cultivations, etc.:- P applied: 11 Nov, 1976. Remaining mineral fertilisers applied: 18 Nov. FYM applied: 16 Dec. N applied: 1st dressing - 19 Apr, 1977, 2nd dressing - 18 May. Cut twice: 21 June, 23 Nov.

ERRATA TO 'YIELDS' 1976 76/R/PG/5

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

page 28. MANURE D1, LIME A should read 1.03 not .03

page 29. MANURE D/F, LIME B should read 4.54 not .54

https://doi.org/10.23637/ERADOC-1-29 *pp 27*

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77/R/PG/5

1ST CUT (21/6/77) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	1.43	1.96	1.29	0.20	1.22
O(D)	1.41	1.57	1.09	1.21	1.32
O/PLOT3	1.76	1.90	0.99	1.20	1.46
P	2.05	2.62	1.94	2.25	2.22
N2P	3.10	3.59	3.12	2.61	3.10
N1MIN	4.88	4.94			4.91
MIN	5.02	5.10	2.65	2.27	3.76
PNAMG	1.88	2.04	2.51	2.43	2.22
N2MIN	5.37	5.93	5.43	4.34	5.27
N2PNAMG	3.63	3.61	3.74	3.19	3.54
N3MIN	5.27	5.58	6.26	4.52	5.41
N3MINSI	5.81	6.56	6.49	4.48	5.83
O/PLOT12	1.47	1.38	1.22	1.21	1.32
D/F	4.85	5.05	5.17	5.36	5.11
N2*MIN	5.48	5.54	5.61	5.90	5.63
MIN(N2*)	3.74	4.40	1.79	2.27	3.05
N1*MIN	4.70	5.21	4.43	4.74	4.77
N1*	2.18	2.70	2.74	2.44	2.51
N2KNAMG0			0.67	0.38	0.53
N2KNAMG2	2.24				2.24
N2KNAMG1	1.59	1.84			1.72
D0	5.37				5.37
D2	5.71				5.71
D1	5.68				5.68
D/N*PK0	5.31				5.31
D/N*PK2	5.49				5.49
D/N*PK1	5.78				5.78

1ST CUT MEAN DM% 21.6

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77/R/PG/5

2ND CUT (23/11/77) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	1.49	2.29	1.50	1.32	1.65
O(D)	1.50	1.10	1.29	1.60	1.37
O/PLOT3	1.28	1.24	1.28	1.91	1.43
P	1.85	1.91	1.86	2.23	1.96
N2P	1.84	1.80	1.99	1.95	1.89
N1MIN	3.20	2.48			2.84
MIN	2.91	2.35	2.59	1.92	2.44
PNAMG	2.11	1.77	2.29	2.34	2.13
N2MIN	2.40	2.51	1.52	1.62	2.01
N2PNAMG	2.07	1.75	1.88	1.59	1.82
N3MIN	2.63	2.46	2.48	4.18	2.94
N3MINSI	3.35	3.20	2.60	4.36	3.38
O/PLOT12	2.97	2.68	2.45	2.75	2.71
D/F	4.06	4.76	4.16	3.76	4.19
N2*MIN	1.96	2.85	2.88	2.58	2.57
MIN(N2*)	2.19	2.29	2.05	2.39	2.23
N1*MIN	2.46	2.33	2.98	2.57	2.58
N1*	2.14	1.88	2.58	2.14	2.19
N2KNAMG0			1.07	0.28	0.68
N2KNAMG2	3.02				3.02
N2KNAMG1	1.78	2.41			2.09
D0	4.55				4.55
D2	3.98				3.98
D1	6.41				6.41
D/N*PK0	4.00				4.00
D/N*PK2	6.50				6.50
D/N*PK1	4.21				4.21

2ND CUT MEAN DM% 25.9

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77/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.92	4.25	2.79	1.52	2.87
O(D)	2.91	2.68	2.38	2.81	2.69
O/PLOT3	3.04	3.14	2.27	3.11	2.89
P	3.90	4.53	3.81	4.48	4.18
N2P	4.93	5.39	5.11	4.56	5.00
N1MIN	8.08	7.42			7.75
MIN	7.93	7.46	5.24	4.19	6.21
PNAMG	3.99	3.81	4.80	4.77	4.34
N2MIN	7.77	8.44	6.95	5.96	7.28
N2PNAMG	5.70	5.37	5.62	4.78	5.37
N3MIN	7.90	8.04	8.74	8.70	8.34
N3MINSI	9.17	9.76	9.08	8.84	9.21
O/PLOT12	4.43	4.06	3.67	3.96	4.03
D/F	8.91	9.82	9.33	9.12	9.29
N2*MIN	7.44	8.38	8.49	8.48	8.20
MIN(N2*)	5.93	6.69	3.84	4.66	5.28
N1*MIN	7.16	7.54	7.40	7.30	7.35
N1*	4.32	4.58	5.32	4.58	4.70
N2KNAMG0			1.75	0.66	1.20
N2KNAMG2	5.27				5.27
N2KNAMG1	3.37	4.25			3.81
D0	9.92				9.92
D2	9.69				9.69
D1	12.09				12.09
D/N*PK0	9.32				9.32
D/N*PK2	11.99				11.99
D/N*PK1	9.98				9.98

TOTAL OF 2 CUTS MEAN DM% 23.7

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77/R/AG/6

AGDELL

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

The eighth year of revised scheme, ryegrass and ryegrass/clover.

For previous years see 'Details' 1967 and 1973, and 74-76/R/AG/6.

Treatments: All combinations of:-

Whole plots

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

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

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

NOTE: Yields taken only from OLDRESD NONE.

2. (RN)CROP (77) — Rotation 1848-1951 and crop 1977:

(F) G/C	With fallow: Roots (turnips or swedes), barley, fallow, wheat 1848-1951. Grass/clover 1977.
(L) G	With legume: Roots, barley, legume (clover or beans), wheat 1848-1951. Grass 1977.

Half plots

3. 1964RESD — Residues of 1964 treatments:

P
K

Quarter plots

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

ARABLE	Arable or fallow
GRASS	Grass

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77/R/AG/6

Sixteenth plots

5. P205 64 K20 64 Rates of 1964 treatments (kg):

P205 to P-test half plots	K20 to K-test half plots
0	0
500	315
1000	630
2000	1260

Sixty fourth plots

6. On P-test half plots:

P205 70-2 Residues of P205 applied 1970-72 (total, kg):

0
375

On K-test half plots:

K20 73-6 Residues of K20 applied 1973-76 (total, kg):

0
870

NOTE: Strips of sixty fourth plots on P-test half plots tested 63 and 94 kg N in 1976. Yields in 1977 were to be taken only from strips given 94 kg N. Strips of sixty fourth plots on K-test half plots were cropped with potatoes and barley in 1976. Yields in 1977 were to be taken only from strips cropped with potatoes. Because growth was sparse no yield cuts were taken. The experiment was topped in December.

Sub plot dimensions: Plots 1, 2, 3 and 4 - 6.04 x 3.02. Plots 5, 6 - 5.43 x 3.02.

Standard applications: Manures: Grass plots only: N at 100 kg as 'Nitro-Chalk'.
Weedkillers: MCPB (Tropotox at 7.0 l in 340 l).

Seed: Grass plots: S.23, sown at 22 kg. Grass/clover plots: S.23 at 22 kg, Blanca at 2 kg, mixture sown at 24 kg.

Cultivations, etc.:- Ploughed: 7 Dec, 1976. Spring-tine cultivated: 7 Apr, 1977. N applied: 27 Apr. Power harrowed: 19 May. Seed sown, harrowed: 20 May. Weedkiller applied: 27 July. Topped: 1 Dec.

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77/R/BN/7

BARNFIELD

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

Sections 1 and 2 fallow. The third year of Italian ryegrass on the rest of the experiment except for the discard of Strip 4, sown to wheat for take-all studies.

For previous years see 'Details' 1967 & 1973 and 74-76/R/BN/7.

Plot dimensions: Ryegrass: 10.7 x 55.9.

Treatments to ryegrass: All combinations of:-

Whole plots

1. MANURE Fertilisers and organic manures:

DN	D N
DNPK	D N P K
NPKMG	N P K (Na) Mg
NP	N P
NPK	N P K
NPMG	N P (Na) Mg
N	N

N: 100 kg N before first cut, 75 kg N after first and second cuts. All as 'Nitro-Chalk'.
P: 35 kg P as single superphosphate (triple superphosphate in 1974).
K: 225 kg K as sulphate of potash.
(Na): 90 kg Na as sodium chloride until 1973
Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of magnesia until 1973).
D: Farmyard manure at 35 tonnes (until 1975).

Quarter plots

2. NFORMRES Residues of forms of N (each supplying 96 kg N):

NS	Nitrate of soda
SA	Sulphate of ammonia
SA/CM	Sulphate of ammonia + castor meal
CM	Castor meal

Castor meal last applied 1961, others until 1959.

Plus one plot MANURE NKMG

NOTES: (1) Yields were taken only from half plots cropped with sugar beet in 1973.
(2) P K Mg and D treatments were applied to Sections 1 and 2, fallow in 1977.

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77/R/BN/7

Standard applications:
Ryegrass: Weedkiller: Mecoprop ('Methoxone 3' at 3.5 l in 220 l).
Fallow: Weedkillers: Paraquat at 0.28 kg ion in 340 l. 2,4-DB at 2.3 kg in 220 l.

Cultivations, etc.:- P applied: 25 Aug, 1976. K applied: 26 Aug.
Ryegrass: N applied: 14 Mar, 1977, 1 June, 29 July. Weedkiller applied: 30 Mar. Cut: 30 May, 20 July, 29 Nov.
Fallow: 2,4-DB applied: 7 Sept, 1976. FYM applied: 25 Oct. Ploughed: 27 Oct. Paraquat applied: 13 May, 1977. Spring-tine cultivated: 19 May. Rotary cultivated twice: 6 June, 6 July. Rotary harrowed: 17 Oct.

1ST CUT (30/5/77) DRY MATTER TONNES/HECTARE

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

NFORMRES / MANURE	NS	SA	SA/CM	CM	MEAN
DN	6.50	6.40	6.10	6.03	6.26
DNPK	6.84	5.67	5.59	6.02	6.03
NPKMG	5.42	4.93	4.99	4.67	5.00
NP	4.67	4.44	5.23	5.00	4.84
NPK	5.12	4.84	4.94	4.71	4.90
NPMG	4.63	4.27	5.73	5.37	5.00
N	3.71	3.33	4.98	5.24	4.32
MEAN	5.27	4.84	5.37	5.29	5.19

MANURE NKMG 4.06

GRAND MEAN 5.15

1ST CUT MEAN DM% 23.9

2ND CUT (20/7/77) DRY MATTER TONNES/HECTARE

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

NFORMRES / MANURE	NS	SA	SA/CM	CM	MEAN
DN	4.91	4.83	4.76	5.08	4.89
DNPK	4.13	4.44	4.26	4.10	4.23
NPKMG	4.07	3.74	4.10	4.21	4.03
NP	3.27	3.51	3.69	3.63	3.53
NPK	3.89	4.10	3.94	3.78	3.93
NPMG	3.45	3.80	3.56	3.56	3.59
N	1.71	3.35	3.79	3.62	3.12
MEAN	3.64	3.97	4.02	4.00	3.90

MANURE NKMG 3.92

GRAND MEAN 3.90

2ND CUT MEAN DM% 26.1

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77/R/BN/7

3RD CUT (29/11/77) DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	3.53	3.40	3.37	3.76	3.52
DNPK	3.77	4.07	3.99	3.73	3.89
NPKMG	2.75	2.73	2.88	2.23	2.65
NP	2.27	2.03	2.49	1.98	2.19
NPK	2.51	2.39	2.63	2.12	2.41
NPMG	2.46	2.43	2.41	2.46	2.44
N	2.67	2.30	2.19	2.01	2.29
MEAN	2.85	2.77	2.85	2.61	2.77

MANURE NKMG 2.07

GRAND MEAN 2.75

3RD CUT MEAN DM% 25.8

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	14.95	14.63	14.24	14.88	14.67
DNPK	14.74	14.18	13.84	13.84	14.15
NPKMG	12.25	11.41	11.96	11.12	11.69
NP	10.22	9.97	11.41	10.61	10.55
NPK	11.52	11.34	11.51	10.61	11.24
NPMG	10.55	10.50	11.70	11.39	11.03
N	8.10	8.98	10.96	10.87	9.73
MEAN	11.76	11.57	12.23	11.90	11.87

MANURE NKMG 10.05

GRAND MEAN 11.80

TOTAL OF 3 CUTS MEAN DM% 25.3

PLOT AREA HARVESTED 0.00568

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77/R/GC/8

GARDEN CLOVER

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

The 124th year, red clover.

For previous years see 'Details' 1967 & 1973, and 74-76/R/GC/8.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. VARIETY — Varieties:

   HUNGAROP — Hungaropoly (resistant to Sclerotinia trifoliorum)
   S.123 — S.123 (susceptible to S. trifoliorum)

2. ALDICARB — Aldicarb to seedbed (kg):

   0
   10

NOTE: Many plants failed to survive the winter. Gaps were re-sown in spring.

Basal applications: Manures: (0:14:28) at 540 kg. K20 at 75 kg, as muriate of potash, after each cut except the last. Mg at 110 kg, as Epsom salts, half in spring, half after first cut. N at 130 kg, as 'Nitro-Chalk', in spring and after each cut except the last.

Seed: Sown at 34 kg.

Cultivations, etc.:- Basal PK and Mg applied: 28 Feb, 1977. Seed sown in gaps, aldicarb and N applied: 28 Apr. Cut: 21 June. Basal N and K applied: 24 June. Cut, basal N, K and Mg applied: 27 July. Cut, basal N and K applied: 6 Sept. Cut: 19 Oct.

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

DRY MATTER TONNES/HECTARE

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

VARIETY	HUNGAROP		S.123		
ALDICARB	0	10	0	10	MEAN
1ST CUT (21/6/77)	0.79	1.58	0.03	0.60	0.75
2ND CUT (27/7/77)	0.66	2.00	0.19	1.65	1.12
3RD CUT (6/9/77)	0.68	1.74	0.61	1.28	1.08
4TH CUT (19/10/77)	0.72	1.05	0.48	0.82	0.77
TOTAL OF 4 CUTS	2.84	6.38	1.31	4.35	3.72

MEAN DM% 1ST CUT 15.3 2ND CUT 21.4
3RD CUT 12.8 4TH CUT 13.7
TOTAL OF 4 CUTS: 15.8

PLOT AREA HARVESTED 0.00011

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77/S/RN/1

ROTATION I

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

Sponsor: A.E. Johnston.

The 79th year, grass, lucerne, potatoes, barley and beans.

For previous years see 'Details' 1967 & 1973, and 74-76/S/RN/1.

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

Treatments: From 1899 to 1969 the experiment followed a four-course rotation of wheat, roots, barley, legumes. Each phase of the rotation was present each year on a separate block. From 1966 each plot was divided, a small area at the south end being continued under the original treatment (OLDTREAT), modified treatments (NEWTREAT) being applied on the larger sub-plots (see below).

In 1970 the rotation was stopped and each pair of blocks was divided for lucerne and grass
(the OLDTREAT sub-plots form a part of the Grass area).

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

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes (1966-1969 15 tonnes on OLDTREAT), 60 tonnes in autumn 1969, none since
B: Bone meal at 0.5 tonnes
N: 1899-1965 - 38 kg N as nitrate of soda. Since 1970 - 100 kg N (38 kg N on OLDTREAT) per cut as 'Nitro-Chalk'
P: 1899-1965 40 kg P205 as single superphosphate. Since 1966 50 kg P205 as triple superphosphate
P1,P2: 50, 100 kg P205 as triple superphosphate (single superphosphate until 1965)
K: 1899-1965 63 kg K20 as muriate of potash. Since 1966 - 126 kg K20 (75 kg K20 on OLDTREAT)

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) On OLDTREAT grass, clover appeared naturally on some plots in 1975. To unify the plots white clover was sown on all at 33 kg.
(3) Lucerne was resown in 1976.

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In 1977 lucerne was ploughed on one pair of blocks and the area divided into three for the first three phases of the arable four-course rotation barley, potatoes, winter beans, wheat. Whole plot treatments are continued on the ploughed area as for NEWTREAT lucerne except all crops, except beans, are given N and plots previously given farmyard manure now receive phosphate fertiliser. Plots on this area are randomly subdivided for each crop for a test of potash fertiliser. All combinations of the following are present:

1. MANURE

Beans	Potatoes and barley
(D)P2	(D)P2N
B	BN
(N)P2	(N)P2N
(P)P1	(P)P1N
(K)P2K	(K)P2KN
(-)P2	(-)P2N
(PK)P1K	(PK)P1KN
(NK)P2K	(NK)P2KN
(NP)P1	(NP)P1N
(NPK)P1K	(NPK)P1KN

Symbols as above except N = 250 kg (potatoes); 94 kg (Barley)

2. POTASH Additional potash fertiliser, as muriate of potash (kg K20):

Barley and beans	Potatoes
0	0
63	224

Standard applications:
Barley: Weedkillers: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 340 l.
Potatoes: Weedkillers: Linuron at 0.93 kg with paraquat at 0.28 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 280 l on four occasions. Insecticide: Menazon ('Saphi-Col' at 0.7 l) applied with the first fungicide application.

Seed: Barley: Julia, sown at 190 kg.
Potatoes: Pentland Crown.
Beans: Minden, sown at 270 kg.

Cultivations, etc.:-
OLDTREAT Grass: P, K and bone meal applied: 16 Feb, 1977. N applied: 16 Mar, 15 June. Cut: 1 June, 28 Sept.
NEWTREAT Grass: P, K and bone meal applied: 16 Feb. N applied: 16 Mar, 15 June, 27 July. Cut: 1 June, 21 July, 28 Sept.
Lucerne: P, K and bone meal applied: 16 Feb. Cut: 15 June, 10 Aug.
All tillage crops: Ploughed: 12 Nov, 1976. Bone meal applied: 16 Feb, 1977. K and additional K applied: 16 Mar.
Potatoes: N applied and planted: 28 Apr. Weedkillers applied: 25 May. Fungicide with insecticide applied: 6 July. Fungicide only applied: 21 July, 10 Aug, 21 Sept. Lifted: 18 Oct.
Barley: Sown and N applied: 6 Apr. Weedkillers applied: 26 May. Combine harvested: 31 Aug.
Beans: Sown: 7 Apr. Combine harvested: 8 Sept.

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77/S/RN/1 GRASS OLDTREAT

DRY MATTER TONNES/HECTARE

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

	1ST CUT (1/6/77)	2ND CUT (28/9/77)	TOTAL OF 2 CUTS
MANURE			
(D)	2.07	1.04	3.11
B	1.87	1.02	2.89
N	2.34	1.19	3.53
P	1.82	1.05	2.87
K	0.84	0.42	1.26
-	1.07	0.59	1.66
PK	2.31	0.95	3.26
NK	2.68	1.21	3.89
NP	2.75	1.41	4.16
NPK	3.64	1.69	5.33
MEAN	2.14	1.06	3.20

1ST CUT MEAN DM% 30.0

2ND CUT MEAN DM% 43.3

TOTAL OF 2 CUTS MEAN DM% 36.6

PLOT AREA HARVESTED 0.00050

77/S/RN/1 GRASS NEWTREAT

DRY MATTER TONNES/HECTARE

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

	1ST CUT (1/6/77)	2ND CUT (21/7/77)	3RD CUT (28/9/77)	TOTAL OF 3 CUTS
MANURE				
(D)N	8.21	3.25	2.00	13.46
BN	6.94	2.56	1.94	11.44
(N)P2N	7.11	2.47	1.94	11.51
(P)P1N	6.81	2.42	1.91	11.14
(K)P2KN	7.58	2.66	2.25	12.49
(-)P2N	7.07	2.43	1.85	11.35
(PK)P1KN	7.39	2.61	2.13	12.13
(NK)P2KN	7.58	2.91	2.31	12.81
(NP)P1N	6.48	2.33	1.70	10.51
(NPK)P1K	7.57	2.93	1.79	12.29
MEAN	7.27	2.66	1.98	11.91

1ST CUT MEAN DM% 27.6
2ND CUT MEAN DM% 34.6
3RD CUT MEAN DM% 32.4
TOTAL OF 3 CUTS MEAN DM% 31.5

1ST CUT PLOT AREA HARVESTED 0.00124
2ND CUT PLOT AREA HARVESTED 0.00116
3RD CUT PLOT AREA HARVESTED 0.00112

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77/S/RN/1 LUCERNE NEWTREAT

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

MANURE	1ST CUT (15/6/77)	2ND CUT (10/8/77)	TOTAL OF 2 CUTS
(D)	3.43	2.04	5.46
B	2.88	1.60	4.48
(N)P2	2.99	1.61	4.60
(P)P1	2.46	1.60	4.06
(K)P2K	2.81	1.67	4.49
(-)P2	3.17	1.73	4.90
(PK)P1K	2.80	1.80	4.61
(NK)P2K	2.78	1.90	4.68
(NP)P1	2.81	1.69	4.50
(NPK)P1K	3.10	2.10	5.19
MEAN	2.92	1.77	4.70

1ST CUT MEAN DM% 20.6
2ND CUT MEAN DM% 31.2
TOTAL OF 2 CUTS MEAN DM% 25.9

PLOT AREA HARVESTED 0.00156

77/S/RN/1 POTATOES

TUBERS TONNES/HECTARE

***** TABLES OF MEAN *****

POTASH MANURE	0	224	MEAN
(D)P2N	38.1	39.8	39.0
BN	25.2	32.5	28.8
(N)P2N	21.6	33.1	27.4
(P)P1N	24.3	31.4	27.9
(K)P2KN	36.7	39.9	38.3
(-)P2N	29.1	36.8	33.0
(PK)P1KN	39.2	40.9	40.1
(NK)P2KN	37.7	40.4	39.1
(NP)P1N	21.9	34.0	27.9
(NPK)P1K	35.4	37.8	36.6
MEAN	30.9	36.7	33.8

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

TABLE	POTASH	MANURES* POTASH
SED	0.78	2.46

* WITHIN SAME LEVEL OF MANURE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	1.57	4.7
BLOCK.WP.SP	10	2.46	7.3

SUB PLOT AREA HARVESTED 0.00143

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77/S/RN/1 BARLEY

GRAIN TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	5.27	6.08	5.68
BN	5.57	5.90	5.73
(N)P2N	5.74	5.86	5.80
(P)P1N	5.62	5.89	5.75
(K)P2KN	6.24	6.02	6.13
(-)P2N	5.74	5.69	5.72
(PK)P1KN	5.77	6.06	5.92
(NK)P2KN	5.76	5.88	5.82
(NP)P1N	5.61	5.27	5.44
(NPK)P1K	5.07	5.46	5.26
MEAN	5.64	5.81	5.72

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

TABLE	POTASH	MANURE* POTASH
SED	0.119	0.376

* WITHIN SAME LEVEL OF MANURE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.220	3.8
BLOCK.WP.SP	10	0.376	6.6

GRAIN MEAN DM% 79.8

STRAW TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	3.08	3.68	3.38
BN	3.58	3.59	3.58
(N)P2N	3.32	3.67	3.50
(P)P1N	3.47	3.82	3.65
(K)P2KN	4.06	3.67	3.86
(-)P2N	3.72	3.87	3.80
(PK)P1KN	3.76	4.17	3.97
(NK)P2KN	3.74	4.03	3.89
(NP)P1N	3.29	3.21	3.25
(NPK)P1K	3.14	3.14	3.14
MEAN	3.52	3.69	3.60

STRAW MEAN DM% 66.9

SUB PLOT AREA HARVESTED 0.00077

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77/S/RN/1 BEANS

GRAIN TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2	4.62	4.21	4.42
B	4.30	3.64	3.97
(N)P2	3.88	2.81	3.34
(P)P1	3.06	3.58	3.32
(K)P2K	4.18	3.91	4.04
(-)P2	3.87	3.70	3.78
(PK)P1K	3.99	3.65	3.82
(NK)P2K	4.21	3.99	4.10
(NP)P1	4.00	3.67	3.83
(NPK)P1K	3.45	3.61	3.53
MEAN	3.96	3.68	3.82

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

TABLE	POTASH	MANURE* POTASH
SED	0.065	0.207

* WITHIN SAME LEVEL OF MANURE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.428	11.2
BLOCK.WP.SP	6	0.207	5.4

GRAIN MEAN DM% 71.2

SUB PLOT AREA HARVESTED 0.00138

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77/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 ninth year of revised scheme, wheat, barley.

For previous years see 'Details' 1967 & 1973, and 74-76/S/RN/2.

Whole plot dimensions: 5.49 x 39.8.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilisers applied to a rotation of crops. Since 1965 the treatments have been changed to evaluate old residues of P (from FYM and superphosphate) and new residues from treatments applied 1965-1967. All crops of the rotation - potatoes, barley, sugar beet, barley - were grown until 1974. The whole experiment was sown to barley in 1975 and 1976, wheat and barley in 1977, and tests combinations of:

Whole plots

1. RESIDUE Residues of previous treatments:-

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

3rd barley after potatoes or sugar beet (1974) tests in addition to 1:-

Sub plots

2. P205 72 Phosphate in 1970-72 (total P205 applied (kg)):

0	0 (2 sub plots/plot)
126	126
252	252
378	378

and some of the combinations of 2 with:-

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3. P205 746 Phosphate in 1974-76 (kg P205):

	1974	1975-6
0	None	None
63x3	63	63
189	189	None

Wheat (Maris Huntsman) after barley (1974-76) after potatoes (1973) and: Wheat (Cappelle) after barley (1974-76) after sugar beet (1973), test in addition to 1:

Sub plots

2. P205 71 Phosphate residues 1969-71 (total P205 applied (kg)):

0	0 (2 sub plots/plot)
126	126
252	252
378	378

and some of the combinations of 2 with:-

3. P205 735 Phosphate in 1973-75 (kg P205):

	1973	1974, 75
0	None	None
63x3	63	63
189	189	None

Standard applications:
Winter wheat: Manures: K20 at 150 kg as muriate of potash. N at 50 kg at drilling as 'Nitro-Chalk'. N at 125 kg top-dressed in spring as 'Nitro-Chalk'. Weedkillers: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 340 l.
Barley: Manures: K20 at 150 kg as muriate of potash. After barley (1975-76) after potatoes (1974): N at 94 kg as 'Nitro-Chalk' (N2). After barley (1975-76) after sugar beet (1974): N at 63 kg as 'Nitro-Chalk' (N1). Weedkillers: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 340 l. Fungicide: Tridemorph at 0.53 kg applied with the weedkillers.

Seed: Winter wheat varieties sown at 200 kg.
Barley: Julia, dressed ethirimol, sown at 190 kg.

Cultivations, etc.:- K applied: 17 Aug, 1976. Ploughed: 6 Sept.
Winter wheat: Sown: 23 Nov. Spring N applied: 28 Apr, 1977. Weedkillers applied: 14 May. Harvested: 1 Sept.
Barley: Sown, N applied: 6 Apr. Weedkillers plus fungicide applied: 25 May. Harvested: 31 Aug.

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77/S/RN/2

WINTER WHEAT (MARIS HUNTSMAN) AFTER BARLEY 1974-76 POTATOES 1973

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

		GRAIN TONNES/HECTARE			STRAW TONNES/HECTARE		
	P205 735	0	63X3	189	0	63X3	189
RESIDUE	P205 71						
(0)0	0	4.08	4.86		2.55	3.10	
(0)0	126			4.51			2.05
(0)0	252		5.72			3.81	
(0)0	378			5.11			2.57
(D)0	0	5.00		5.00	3.15		2.34
(D)0	126		6.33			3.43	
(D)0	252			5.47			2.59
(D)0	378		5.72			3.27	
(DP)0	0	6.06		6.35	3.29		3.78
(DP)0	126		6.81			4.60	
(DP)0	252			6.43			3.27
(DP)0	378		5.94			3.52	
(DP)D2	0	6.45	6.77		3.66	4.33	
(DP)D2	126			5.61			2.86
(DP)D2	252		6.91			3.77	
(DP)D2	378			6.43			3.66
(DP)D2P1	0	6.42		6.82	3.47		3.80
(DP)D2P1	126		5.97			3.52	
(DP)D2P1	252			6.69			4.06
(DP)D2P1	378		6.07			3.39	
(DP)P1	0	6.42		7.18	4.33		4.08
(DP)P1	126		6.33			3.81	
(DP)P1	252			6.67			4.29
(DP)P1	378		6.16			3.52	
(DP)P2	0	6.18	7.05		3.77	4.69	
(DP)P2	126			6.42			3.43
(DP)P2	252		7.03			4.00	
(DP)P2	378			6.67			3.75
(DP52)0	0	6.65	7.27		4.14	4.82	
(DP52)0	126			5.47			3.21
(DP52)0	252		6.42			3.79	
(DP52)0	378			6.52			4.70

GRAIN MEAN DM% 77.6

STRAW MEAN DM% 88.2

PLOT AREA HARVESTED 0.00077

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77/S/RN/2

WINTER WHEAT (CAPPELLE) AFTER BARLEY 1974-6 SUGAR BEET 1973

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

		GRAIN TONNES/HECTARE			STRAW TONNES/HECTARE		
	P205 735	0	63X3	189	0	63X3	189
RESIDUE	P205 71						
(0)0	0	2.86		3.82	2.33		2.98
(0)0	126		5.15			3.80	
(0)0	252			4.67			3.10
(0)0	378		5.02			3.63	
(D)0	0	3.68	4.30		2.88	2.83	
(D)0	126			4.51			3.12
(D)0	252		5.11			3.50	
(D)0	378			5.02			3.51
(DP)0	0	5.14	5.76		4.28	4.03	
(DP)0	126			5.54			4.06
(DP)0	252		5.66			3.30	
(DP)0	378			5.88			4.19
(DP)D2	0	6.21		6.12	3.81		4.66
(DP)D2	126		6.74			4.61	
(DP)D2	252			6.47			4.42
(DP)D2	378		6.36			4.48	
(DP)D2P1	0	6.86	6.35		4.81	4.85	
(DP)D2P1	126			6.31			4.85
(DP)D2P1	252		6.89			4.82	
(DP)D2P1	378			6.35			4.02
(DP)P1	0	6.27	6.33		4.83	4.56	
(DP)P1	126			6.50			4.40
(DP)P1	252		6.50			4.28	
(DP)P1	378			6.33			4.70
(DP)P2	0	5.87		6.24	4.16		4.19
(DP)P2	126		6.11			4.04	
(DP)P2	252			6.26			4.36
(DP)P2	378		6.82			4.75	
(DP52)0	0	6.47		6.02	4.42		3.97
(DP52)0	126		5.87			4.82	
(DP52)0	252			6.51			5.33
(DP52)0	378		5.42			4.16	

GRAIN MEAN DM% 78.1

STRAW MEAN DM% 85.6

PLOT AREA HARVESTED 0.00077

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77/S/RN/2

BARLEY AFTER BARLEY 1975-6 POTATOES 1974
AND
BARLEY AFTER BARLEY 1975-6 SUGAR BEET 1974

GRAIN TONNES/HECTARE

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

PREVIOUS CROP 1974

		POTATOES(N2)			SUGAR BEET(N1)		
	P205 746	0	63X3	189	0	63X3	189
RESIDUE	P205 72						
(0)0	0	4.43		4.19	4.16	4.68	
(0)0	126		5.53				4.20
(0)0	252			4.55		4.80	
(0)0	373		4.77				4.54
(D)0	0	4.43	5.76		4.94		5.17
(D)0	126			4.65		5.42	
(D)0	252		5.00				5.27
(D)0	373			5.96		5.29	
(DP)0	0	5.13	5.23		5.06		5.27
(DP)0	126			5.61		5.79	
(DP)0	252		6.58				5.51
(DP)0	373			5.16		5.29	
(DP)D2	0	5.84		5.62	5.48	5.39	
(DP)D2	126		5.63				5.54
(DP)D2	252			6.48		5.79	
(DP)D2	373		5.85				5.55
(DP)D2P1	0	5.91	5.79		5.77		5.62
(DP)D2P1	126			5.91		5.68	
(DP)D2P1	252		6.20				6.28
(DP)D2P1	373			6.55		5.68	
(DP)P1	0	5.85	5.55		5.68		5.66
(DP)P1	126			5.03		5.79	
(DP)P1	252		6.55				5.94
(DP)P1	373			6.02		5.89	
(DP)P2	0	6.34		5.86	5.80	5.29	
(DP)P2	126		6.03				5.27
(DP)P2	252			5.89		5.91	
(DP)P2	373		5.55				5.91
(DP52)0	0	5.21		5.59	5.01	5.55	
(DP52)0	126		5.62				5.07
(DP52)0	252			5.71		5.28	
(DP52)0	373		6.11				5.54

GRAIN MEAN DM% (PREVIOUS CROP 1974 POTATOES) 79.7

GRAIN MEAN DM% (PREVIOUS CROP 1974 SUGAR BEET) 80.1

PLOT AREA HARVESTED 0.00077

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77/R/RN/1 and 77/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. From 1968, continuous wheat was grown on some blocks after the three test crops to study the build-up and decline of take-all (Gaeumannomyces graminis) after the different cropping sequences. From 1977 new crop sequences are being introduced on these blocks - Highfield and Fosters.

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

The 29th year, old grass, leys, sugar beet, wheat, oats, barley.

For previous years see 'Details' 1967 & 1973 and 74-76/R/RN/1&2.

The experiment is duplicated on:-

HIGHFIELD — A site with much organic matter initially (ploughed out from permanent grass) (77/R/RN/1)

FOSTERS — A site with little organic matter initially (77/R/RN/2)

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

	Treatment crops	Test crops
LUCERNE	LU, LU, LU,	W, P, B
CLOGRA	LC, LC, LC,	W, P, B
GRASS	LN, LN, LN,	W, P, B
ARABLE	H, SB, O,	W, P, B

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

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

From 1975 the barley test crop was changed to wheat.

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

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

In 1962 and 1963 some of the old and reseeded grass plots were divided for management identical to:-

C — Clover/grass ley
N — All-grass ley

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77/R/RN/1 and 77/R/RN/2

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

From 1968 only two phases on each field continued in the original six-course rotation (the museum blocks). The four other phases (the new sequence blocks) were sown to wheat every year at the end of the test-crop cycle. In 1977 one phase, fallowed in 1976, started a new sequence of treatment cropping, one phase was fallowed and the other two remained in wheat (no yields). The new sequences will be introduced progressively on these other phases. The new sequences are:

SEQUENCE		Treatment crops	Test crops
LUCERNE	(previously LUCERNE)	LU, LU, LU	W, W, W, W
CLOGRA	(previously CLOGRA)	LC, LC, LC	W, W, W, W
GRASS/G	(previously GRASS)	R, R, R	W, W, W, W
ARABLE/A	(previously ARABLE)	O, P, BE	W, W, W, W
ARABLE/R	(previously RESEEDED)	B, B, W	W, W, W, W
GRASS/OG	(previously OLDGRASS)	R, R, R	W, W, W, W

R = ryegrass, BE = beans. Other symbols as above. All ploughed at the end of the treatment crop cycle except GRASS/OG - direct drilled to wheat. Treatment crop cycles start after nine previous cereals followed by one fallow. In treatment years yields are taken only from barley and wheat.

Additional treatments to 2nd test crop wheat in the original rotation:-

Sub plots

FYMRES70 Farmyard manure residues, last applied 1970:

NONE None
FYM 30 tonnes on each occasion

Sub plots

N 77 Nitrogen fertiliser (kg N):

0
50
100
150

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77/R/RN/1 and 77/R/RN/2

Standard applications:
- Museum blocks:
  - 2nd Treatment Crops:
    - All-grass ley: Manures: (0:14:28) at 540 kg. (25:0:16) at 300 kg in spring and after each cut except the last.
    - Clover-grass ley: Manures: (0:14:28) at 540 kg.
    - Lucerne: Manures: (0:14:28) at 810 kg.
    - Sugar beet: Manures: (13:13:20) at 1260 kg. Insecticide: Pirimicarb at 0.14 kg in 220 l.
  - 2nd Test Crop: Wheat: Manures: (0:20:20) at 380 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Insecticide: Pirimicarb at 0.14 kg in 280 l.
  - Reseeded Grass and Old Grass: Manures: (0:14:28) at 540 kg.
  - All-grass half plots: (25:0:16) at 300 kg in spring and after each cut except the last.
- New sequence blocks:
  - All crops (except wheat): Manures: Chalk at 8.7 t, Highfield only.
  - Lucerne: Manures: (0:14:28) at 720 kg. Weedkiller: 2,4-DB at 2.5 kg in 340 l.
  - Clover-grass ley and Ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg. Weedkiller: MCPB ('Tropotox' at 7.0 l in 340 l).
  - Oats and barley: Manures: (20:14:14) at 350 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).
  - Wheat: Manures: (0:20:20) at 380 kg. 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed:
- Museum blocks:
  - All-grass ley: Pecora Timothy at 15 kg, Meadow Fescue S215 at 19 kg. Mixture sown at 34 kg.
  - Clover-grass ley: Pecora Timothy at 15 kg, Meadow Fescue S215 at 19 kg, White Clover S100 at 3 kg. Mixture sown at 37 kg.
  - Sugar beet: Klein E, sown at 9 kg.
  - Wheat: Cappelle, sown at 200 kg.
- New sequence blocks:
  - Lucerne: Vertus, sown at 28 kg.
  - Clover-grass ley: Timothy S48 at 15 kg, Meadow Fescue S215 at 19 kg, New Zealand Huia Clover at 3 kg. Mixture sown at 37 kg.
  - Ryegrass: S24, sown at 22 kg.
  - Oats: Manod, sown at 200 kg.
  - Barley: Julia, sown at 160 kg.
  - Wheat: Cappelle, sown at 200 kg.

Cultivations, etc.:-
- Museum blocks:
  - All-grass ley and clover-grass ley: Ploughed: 20 Aug, 1976. Spring-tine cultivated, harrowed, seed sown: 21 Sept. PK applied: 23 Dec. NK applied (all-grass ley only): 3 Mar, 1977, 26 May, 1 July, 5 Aug. Cut: 24 May, 30 June, 4 Aug, 23 Nov.
  - Lucerne: PK applied: 23 Dec, 1976. Cut: 29 June, 1977, 16 Aug, 1 Dec.

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77/R/RN/1 and 77/R/RN/2

Sugar beet: Ploughed: 20 Aug, 1976. Rotary harrowed: 7 Apr, 1977. NPK applied: 9 Apr. Spring-tine cultivated, chain harrowed, rolled, seed sown: 12 Apr. Tractor hoed: 27 May, 16 June. Plants singled: 2 June. Insecticide applied: 6 July. Lifted by hand: 11 Nov.

Wheat: Heavy spring-tine cultivated twice: 23 Nov, 1976. Sown: 24 Nov. Test N applied: 28 Apr, 1977. Weedkillers applied: 2 May. Insecticide applied: 15 July. Combine harvested: 9 Sept.

Reseeded Grass and Old Grass: PK applied: 23 Dec, 1976. NK applied (to N sub plots only): 3 Mar, 1977, 26 May, 1 July, 5 Aug. Cut: 24 May, 30 June, 4 Aug, 23 Nov.

New sequence blocks:

Fallow: Ploughed: 22 Sept, 1976. Deep-tine cultivated: 26 Nov. Rotary cultivated: 3 May, 1977, 21 June, 14 July. Ploughed: 10 Oct.

Lucerne: Chalk applied: 17 Sept, 1976. Deep-tine cultivated: 26 Nov. Rotary harrowed: 8 Mar, 1977. Rotary cultivated, (Highfield only): 5 Apr. Spring-tine cultivated: 7 Apr. PK applied: 19 May. Power harrowed, seed sown: 1 June. Weedkiller applied: 4 Aug. Topped: 13 Aug, 1 Dec.

Clover-grass ley and ryegrass: Chalk applied: 17 Sept, 1976. Deep-tine cultivated: 26 Nov. Rotary harrowed: 8 Mar, 1977. Rotary cultivated, (Highfield only): 5 Apr. Spring-tine cultivated: 7 Apr. NK (ryegrass only) and PK applied: 19 May. Spring-tine cultivated, seed sown: 20 May. NK applied (clover-grass only): 8 July. Weedkiller applied: 27 July. Topped: 13 Aug, 1 Dec.

Oats: Chalk applied: 17 Sept, 1976. Deep-tine cultivated: 26 Nov. Rotary harrowed: 8 Mar, 1977. Rotary cultivated, (Highfield only): 5 Apr. Spring-tine cultivated: 7 Apr. Sown: 8 Apr. Weedkillers applied: 30 May. Combine harvested: 6 Sept.

Barley: Chalk applied: 17 Sept, 1976. Deep-tine cultivated: 26 Nov. Rotary harrowed: 8 Mar, 1977. Rotary cultivated, (Highfield only): 5 Apr. Spring-tine cultivated: 7 Apr. Sown: 8 Apr. Weedkillers applied: 30 May. Combine harvested: 26 Aug.

Wheat: Ploughed: 22 Sept, 1976. Deep-tine cultivated: 23 Nov. Sown: 24 Nov. 'Nitro-Chalk' applied: 15 Apr, 1977. Weedkillers applied: 2 May. Insecticide applied: 15 July. Combine harvested: 11 Sept.

NOTES: (1) Soils from the new sequence blocks were bioassayed for Gaeumannomyces in March before sowing.
(2) Barley was sampled in July to assess take-all.
(3) Test wheat in the museum blocks was sampled in July to assess take-all and Phialophora.
(4) The yields of oats were not recorded.

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77/R/RN/1 AND 77/R/RN/2

MUSEUM BLOCKS

DRY MATTER: TONNES/HECTARE

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

	HIGHFIELD	FOSTERS
CLOVER-GRASS LEY		
TOTAL OF 4 CUTS	5.81	6.55
MEAN DM%	21.2	19.0
ALL GRASS LEY		
TOTAL OF 4 CUTS	12.16	10.91
MEAN DM%	22.0	22.4
LUCERNE		
TOTAL OF 3 CUTS	11.62	11.31
MEAN DM%	19.8	20.5
SUGAR BEET		
ROOTS (WASHED)	39.3	38.2
SUGAR PERCENTAGE	17.2	17.4
TOTAL SUGAR	6.77	6.66
TOPS	45.5	37.4

OLD GRASS

TOTAL OF 4 CUTS

	HIGHFIELD	
	C	N
29TH EXPTL YEAR		
BLOCKS 1 & 4	4.52	9.85
BLOCK 2	4.34	10.66
MEAN DM%	26.0	22.2

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RESEEDED GRASS

TOTAL OF 4 CUTS

		HIGHFIELD			FOSTERS	
	BLOCKS	C	N	BLOCKS	C	N
29TH EXPTL YEAR	1 & 4	4.15	10.36	1 & 3	3.40	9.69
29TH EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	7.69	11.00	2 & 4	6.88	11.07
MEAN DM%		22.7	22.5		22.8	22.4

NEW SEQUENCE BLOCKS

DRY MATTER: TONNES/HECTARE

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

BARLEY

	HIGHFIELD	FOSTERS
	5.52	5.22
MEAN DM%	76.6	78.2

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77/R/RN/1 HIGHFIELD

WINTER WHEAT 2ND TEST CROP

GRAIN TONNES/HECTARE

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

N 77	0	50	100	150	MEAN
FYMRES70					
NONE	4.31	5.55	5.60	6.13	5.40
FYM	4.28	5.29	5.96	5.88	5.35
MEAN	4.29	5.42	5.78	6.00	5.37

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES70					
NONE	5.97	5.08	5.33	5.21	5.40
FYM	5.72	5.18	5.24	5.26	5.35
MEAN	5.84	5.13	5.28	5.24	5.37

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
N 77					
0	4.70	4.53	4.31	3.62	4.29
50	5.67	5.66	5.32	5.02	5.42
100	6.47	4.92	5.51	6.22	5.78
150	6.54	5.40	5.99	6.08	6.00
MEAN	5.84	5.13	5.28	5.24	5.37

	ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE
FYMRES70	N 77				
NONE	0	4.83	4.60	4.42	3.37
	50	6.01	5.69	5.55	4.93
	100	6.50	4.44	5.38	6.09
	150	6.54	5.57	5.96	6.46
FYM	0	4.58	4.47	4.20	3.87
	50	5.32	5.64	5.09	5.11
	100	6.44	5.39	5.65	6.35
	150	6.54	5.24	6.03	5.69

GRAIN MEAN DM% 76.9

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77/R/RN/1 HIGHFIELD

WINTER WHEAT 2ND TEST CROP

STRAW TONNES/HECTARE

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

N 77	0	50	100	150	MEAN
FYMRES70					
NONE	2.85	4.18	4.49	4.95	4.12
FYM	2.87	3.70	4.63	4.87	4.02
MEAN	2.86	3.94	4.56	4.91	4.07

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES70					
NONE	4.57	3.99	4.02	3.90	4.12
FYM	4.72	3.79	3.70	3.86	4.02
MEAN	4.64	3.89	3.86	3.88	4.07

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
N 77					
0	3.28	3.30	2.45	2.42	2.86
50	4.20	4.10	3.88	3.57	3.94
100	5.58	3.92	4.21	4.54	4.56
150	5.52	4.23	4.89	4.99	4.91
MEAN	4.64	3.89	3.86	3.88	4.07

	ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE
FYMRES70	N 77				
NONE	0	3.42	3.25	2.45	2.28
	50	4.28	4.31	4.42	3.70
	100	5.54	4.11	4.18	4.14
	150	5.02	4.28	5.02	5.49
FYM	0	3.13	3.35	2.45	2.56
	50	4.12	3.89	3.34	3.44
	100	5.62	3.72	4.25	4.95
	150	6.03	4.18	4.77	4.49

STRAW MEAN DM% 87.9

SUB PLOT AREA HARVESTED 0.00659

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77/R/RN/2 FOSTERS

WHEAT 2ND TEST CROP

GRAIN TONNES/HECTARE

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

N 77	0	50	100	150	MEAN
FYMRES70					
NONE	4.02	5.08	6.02	6.36	5.37
FYM	4.30	5.31	6.22	6.45	5.57
MEAN	4.16	5.20	6.12	6.41	5.47

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES70					
NONE	5.69	5.51	4.98	5.31	5.37
FYM	6.05	5.67	5.23	5.33	5.57
MEAN	5.87	5.59	5.10	5.32	5.47

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
N 77					
0	4.53	4.73	3.94	3.45	4.16
50	6.04	5.30	4.75	4.71	5.20
100	6.35	5.92	5.81	6.40	6.12
150	6.58	6.41	5.91	6.73	6.41
MEAN	5.87	5.59	5.10	5.32	5.47

	ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE
FYMRES70	N 77				
NONE	0	4.36	4.45	3.67	3.60
	50	5.87	5.56	4.45	4.46
	100	5.88	5.48	6.01	6.71
	150	6.66	6.55	5.77	6.47
FYM	0	4.70	5.01	4.21	3.29
	50	6.20	5.04	5.05	4.95
	100	6.82	6.37	5.60	6.10
	150	6.49	6.27	6.06	6.99

GRAIN MEAN DM% 80.3

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77/R/RN/2 FOSTERS

WHEAT 2ND TEST CROP

STRAW TONNES/HECTARE

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

N 77	0	50	100	150	MEAN
FYMRES70					
NONE	2.12	3.53	4.26	4.88	3.70
FYM	2.37	3.77	4.74	5.27	4.04
MEAN	2.25	3.65	4.50	5.08	3.87

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES70					
NONE	4.08	3.68	3.39	3.64	3.70
FYM	4.39	4.03	3.81	3.92	4.04
MEAN	4.23	3.86	3.60	3.78	3.87

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
N 77					
0	2.41	2.57	2.29	1.71	2.25
50	4.48	3.49	3.16	3.48	3.65
100	4.57	4.34	4.31	4.79	4.50
150	5.48	5.02	4.65	5.16	5.08
MEAN	4.23	3.86	3.60	3.78	3.87

	ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE
FYMRES70	N 77				
NONE	0	2.20	2.41	2.07	1.79
	50	4.65	3.52	2.88	3.10
	100	3.89	3.92	4.57	4.67
	150	5.58	4.88	4.03	5.02
FYM	0	2.62	2.73	2.50	1.63
	50	4.31	3.47	3.44	3.86
	100	5.25	4.76	4.04	4.91
	150	5.38	5.16	5.26	5.29

STRAW MEAN DM% 89.1

SUB PLOT AREA HARVESTED 0.00659

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77/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without leys - Woburn Stackyard D.

Sponsors: K. Evans, A.E. Johnston, F.G.W. Jones, G.A. Salt.

The 40th year, leys, barley, oats, wheat.

For previous years see 'Details' 1967 & 1973 and 74-76/W/RN/3.

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

Whole plot dimensions: 8.53 x 40.7.

Treatments: All phases of four five-course rotations were originally present:

ROTATION

LEY	Clover/grass ley:	L, L, L, P, W
CLO	All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL P, W
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W

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

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated (PER)
On four plots in each block arable rotations alternated each five years with ley rotations (ALT)

From 1976 all the rotations were changed on all phases except for the first and second test crops in 1976:

(Previous LEY) LN, LN, LN, W, B
(Previous CLO) LC, LC, LC, W, B
(Previous A) F, F, O, W, B
(Previous A H) B, B, O, W, B

LN = grass ley with N, LC = clover/grass ley no N, O = oats, F = fallow

Plots hitherto in alternating rotations were changed to test eight-year leys:

LN, LN, LN, LN, LN, LN, LN, LN, W, B
LC, LC, LC, LC, LC, LC, LC, LC, W, B

The new scheme started by sowing these new leys in spring 1976 on four phases and in spring 1977 on the fifth phase (2nd test crop in 1976). The long-term leys will be ploughed up after five to eight years initially depending on starting point in relation to test crop.

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77/W/RN/3

Treatments to first test crop wheat and second test crop barley:

ROT CYCL Combinations of rotations and cycles defined above

LEY PER
CLO PER
A PER
A ALT
A H PER
A H ALT

Yields are taken from first and second test crops only.

Additional treatments to first test crop, wheat:-

1/2 plots

1. FYMRES67 Farmyard manure residues, last applied 1967:

   NONE None
   FYM 38 tonnes on each occasion

1/8 plots

2. N Nitrogen fertiliser (kg N):

   0
   63
   126
   189

Additional treatments to second test crop, barley:-

1/2 plots

1. FYMRES66 Farmyard manure residues, last applied 1966:

   NONE None
   FYM 38 tonnes on each occasion

1/8 plots

2. N Nitrogen fertiliser (kg N):

   0
   50
   100
   150

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77/W/RN/3

Corrective K dressings (kg K20), as muriate of potash, applied to first test crop wheat.

Continuous rotations	No FYM half plots	FYM half plots
Ley	50	0
Clover	80	100
Arable with hay	113	113
Arable	188	151
Alternating rotations (last two rotations in order)		
Ley/Arable	113	126
Sainfoin/Arable	126	126
Ley/Arable with hay	100	0
Sainfoin/Arable with hay	63	0

Standard applications:-

Grass ley and Clover/grass ley, 1st year: Manures: (0:14:28) at 540 kg. N at 70 kg as 'Nitro-Chalk'. Weedkiller: Glyphosate at 1.7 kg in 280 l.

Grass ley, 2nd, 3rd, 4th and 5th years: Manures: Magnesian limestone at 5 t to 2nd year only. (25:0:16) at 300 kg in spring, and at 400 kg after the first cut. Weedkiller: Paraquat at 0.84 kg ion in 280 l to 3rd, 4th and 5th years only.

Clover/grass ley, 2nd, 3rd, 4th and 5th years: Manures: Magnesian limestone at 5 t to 2nd year only. K20 at 48 kg in spring and after topping in July. Weedkiller: Paraquat at 0.84 kg ion in 280 l to 3rd, 4th and 5th years only.

Barley: Manures: 1st and 2nd treatment crops: (20:14:14) at 400 kg. 2nd test crop: Magnesian limestone at 5 t, (0:20:20) at 300 kg. Weedkillers: Paraquat at 0.84 kg ion in 280 l. 2nd test crop only: Glyphosate at 1.7 kg in 280 l. 2nd test crop: Nematicide: Aldicarb at 10 kg.

Oats: Manures: (20:14:14) at 400 kg. Weedkillers: Paraquat at 0.84 kg ion in 280 l, Glyphosate at 1.7 kg in 280 l.

Winter wheat: Manures: (0:20:20) at 300 kg combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 280 l. Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l. Nematicide: Aldicarb at 10 kg.

Fallow: Weedkillers: Glyphosate at 1.7 kg in 280 l (1st year fallow). Paraquat at 0.84 kg ion in 280 l (2nd year fallow).

Varieties: Grass ley: Timothy S48 15 kg, Meadow fescue S215 19 kg, sown at 34 kg.
Clover/grass: Timothy S48 20 kg, Meadow fescue S215 16 kg, Huia white clover 4 kg, sown at 40 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.
Oats: Manod, sown at 200 kg.
Winter wheat: Cappelle, sown at 210 kg.

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Cultivations, etc.:- Treatment crops:

Grass ley and clover/grass ley, 1st year: Subsoiled, tines 140 cm apart, 50 cm deep: 7 Sept, 1976. Glyphosate applied: 24 Sept. Ploughed: 1 Nov. Spring-tine cultivated: 10 Mar, 1977. PK applied, N applied to grass ley only: 25 Apr. Spring-tine cultivated with crumbler attached, seeds sown: 18 May. Cut: 23 Sept.

Grass ley and clover/grass ley, 2nd year: Resown by hand: 13 Oct, 1976. NK applied to grass ley and K applied to clover/grass ley: 7 Apr, 1977. Grass ley cut: 1 July. K applied to clover/grass ley: 19 July. NK applied to grass ley: 21 July. Grass ley and clover/grass ley cut: 22 Sept.

Grass ley and clover/grass ley, 3rd year: Magnesian limestone applied: 6 Sept, 1976. Weedkiller applied: 8 Oct. Resown by hand: 13 Oct. NK applied to Grass ley and K applied to clover/grass ley: 7 Apr, 1977. Grass ley cut: 1 July. K applied to clover/grass ley: 19 July. NK applied to grass ley: 21 July. All leys cut: 22 Sept.

Grass leys and clover/grass leys, 4th and 5th years: Weedkiller applied: 8 Oct, 1976. Resown by hand: 13 Oct. NK applied to grass leys and K applied to clover/grass leys: 7 Apr, 1977. Grass leys cut: 1 July. K applied to clover/grass leys: 19 July. NK applied to grass leys: 21 July. All leys cut: 23 Sept.

Barley: 1st and 2nd treatment crops: Subsoiled, tines 140 cm apart, 50 cm deep: 7 Sept, 1976 (1st treatment crop only). Glyphosate applied: 24 Sept. Ploughed 1st treatment crop: 1 Nov, 2nd treatment crop: 9 Nov. Spring-tine cultivated: 10 Mar, 1977. Rotary cultivated, seed sown: 8 Apr. NPK applied: 12 Apr. Ioxynil plus mecoprop applied: 19 May. Combine harvested: 30 Aug.

Oats: 3rd treatment crop: Glyphosate applied: 24 Sept, 1976. Paraquat applied: 8 Oct. Ploughed: 9 Nov. Spring-tine cultivated: 10 Mar, 1977. Rotary cultivated, seed sown: 8 Apr. NPK applied: 12 Apr. Ioxynil plus mecoprop applied: 19 May. Combine harvested: 3 Sept.

Fallow, 1st treatment year: Subsoiled, tines 140 cm apart, 50 cm deep: 7 Sept, 1976. Glyphosate applied: 24 Sept. Ploughed: 1 Nov. Spring-tine cultivated twice: 10 Mar, 1977, 30 June. Rotary cultivated twice: 17 June, 16 Aug.

Fallow, 2nd treatment year: Paraquat applied: 24 Sept, 1976. Ploughed: 9 Nov. Spring-tine cultivated twice: 10 Mar, 1977, 30 June. Rotary cultivated twice: 17 June, 16 Aug.

Test crops:

Winter wheat, 1st test crop: Paraquat applied: 8 Oct, 1976. Ploughed: 8 Nov. Corrective K applied: 11 Nov. Aldicarb applied, rotary cultivated, seed sown: 24 Nov. N applied: 14 Apr. Ioxynil plus mecoprop applied: 15 May. Insecticide applied: 11 July. Combine harvested: 7 Sept.

Barley, 2nd test crop: Magnesian limestone applied: 6 Sept, 1976. Glyphosate applied: 24 Sept. Paraquat applied: 8 Oct. Ploughed: 9 Nov. Spring-tine cultivated: 10 Mar, 1977. Aldicarb applied, rotary cultivated, seed sown: 8 Apr. N applied: 12 Apr. Weedkiller applied: 19 May. Combine harvested: 30 Aug.

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77/W/RN/3

BARLEY 2ND TEST CROP

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

GRAIN TONNES/HECTARE

ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	MEAN
FYMRES66							
NONE	4.35	4.56	3.63	4.07	4.22	4.24	4.18
FYM	4.13	4.52	3.54	3.89	4.24	4.25	4.09
N							
0	3.09	3.17	0.52	1.39	1.85	2.45	2.08
50	4.72	4.78	3.79	4.18	4.58	4.16	4.37
100	4.72	5.32	4.77	5.18	5.23	5.12	5.06
150	4.44	4.89	5.27	5.17	5.25	5.25	5.04
MEAN	4.24	4.54	3.59	3.98	4.23	4.25	4.14

	ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT
FYMRES66	N						
NONE	0	3.11	3.14	0.83	1.46	1.92	2.37
	50	4.60	4.91	3.93	4.13	4.61	4.16
	100	5.01	5.18	4.69	5.30	5.12	5.22
	150	4.70	5.00	5.06	5.40	5.22	5.21
FYM	0	3.07	3.20	0.21	1.31	1.78	2.53
	50	4.84	4.66	3.64	4.23	4.55	4.16
	100	4.43	5.45	4.84	5.07	5.34	5.03
	150	4.17	4.77	5.48	4.94	5.28	5.28

GRAIN MEAN DM% 82.7

STRAW TONNES/HECTARE

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

ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	MEAN
FYMRES66							
NONE	2.79	3.31	2.16	2.29	2.46	2.44	2.58
FYM	2.86	3.68	2.02	2.12	2.45	2.90	2.67
N							
0	1.51	1.70	0.31	0.53	0.73	1.13	0.98
50	3.11	3.24	2.09	2.01	2.39	2.36	2.53
100	3.37	4.64	2.88	3.12	3.31	3.49	3.47
150	3.32	4.40	3.08	3.18	3.41	3.70	3.51
MEAN	2.83	3.50	2.09	2.21	2.46	2.67	2.63

	ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT
FYMRES66	N						
NONE	0	1.51	1.63	0.35	0.59	0.54	1.06
	50	2.96	3.07	2.15	2.01	2.45	2.15
	100	3.65	4.36	3.00	3.14	3.30	3.16
	150	3.04	4.19	3.15	3.43	3.56	3.40
FYM	0	1.51	1.78	0.26	0.47	0.91	1.20
	50	3.25	3.41	2.04	2.01	2.32	2.57
	100	3.09	4.92	2.77	3.09	3.33	3.83
	150	3.60	4.62	3.01	2.93	3.25	4.00

STRAW MEAN DM% 83.4 SUB PLOT AREA HARVESTED 0.00260

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77/W/RN/3

WINTER WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

ROT CYCL / FYMRES67	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	MEAN
NONE	4.13	4.34	4.05	4.14	3.82	3.87	4.06
FYM	4.03	4.08	3.71	4.29	4.32	3.83	4.04
N							
0	2.78	3.35	2.31	2.72	2.64	2.58	2.73
63	4.42	3.88	3.79	4.49	4.65	3.74	4.16
126	5.16	4.75	4.93	5.26	4.89	4.60	4.93
189	3.97	4.86	4.48	4.38	4.12	4.48	4.38
MEAN	4.08	4.21	3.88	4.21	4.07	3.85	4.05

FYMRES67	ROT CYCL N	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT
NONE	0	2.68	3.11	2.22	2.42	2.22	2.57
	63	4.49	4.14	3.99	4.74	4.12	3.73
	126	5.13	4.72	5.08	5.40	5.21	4.36
	189	4.22	5.39	4.90	4.01	3.75	4.81
FYM	0	2.87	3.58	2.40	3.02	3.06	2.58
	63	4.34	3.63	3.59	4.25	5.18	3.75
	126	5.20	4.79	4.78	5.11	4.56	4.84
	189	3.72	4.32	4.05	4.76	4.49	4.16

GRAIN MEAN DM% 80.4

STRAW TONNES/HECTARE

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

ROT CYCL / FYMRES67	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	MEAN
NONE	3.33	3.65	2.52	3.05	3.49	3.23	3.21
FYM	4.14	3.88	2.12	3.06	3.92	2.62	3.29
N							
0	1.91	2.61	1.43	1.91	1.94	1.81	1.93
63	4.03	3.35	2.36	3.50	3.25	2.77	3.21
126	4.87	4.68	2.71	3.73	4.88	3.62	4.08
189	4.14	4.41	2.80	3.08	4.75	3.52	3.78
MEAN	3.74	3.76	2.32	3.06	3.71	2.93	3.25

FYMRES67	ROT CYCL N	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT
NONE	0	1.42	2.12	1.34	1.56	1.40	2.09
	63	3.61	3.35	2.61	3.80	2.88	3.19
	126	4.39	4.36	3.06	4.36	4.61	3.99
	189	3.91	4.76	3.09	2.48	5.09	3.67
FYM	0	2.40	3.10	1.51	2.26	2.48	1.53
	63	4.44	3.36	2.11	3.21	3.63	2.34
	126	5.36	5.00	2.35	3.10	5.15	3.25
	189	4.37	4.05	2.50	3.69	4.40	3.37

STRAW MEAN DM% 67.1 SUB PLOT AREA HARVESTED 0.00260

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77/W/RN/4

MARKET GARDEN

Object: To study the residual effects of fertilisers and organic manures applied in the period 1942-67 - Woburn Lansome I.

Sponsor: A.E. Johnston.

The 36th year, ryegrass.

For previous years see 'Details' 1967 & 1973 and 74-76/W/RN/4.

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

Whole plot dimensions: 8.53 x 5.18.

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

Basal applications: Manures: Chalk at 2.8 t. 80 kg N as 'Nitro-Chalk' in spring and after the first cut and 87 kg N after the second cut. Weedkiller: Mecoprop at 1.3 kg in 280 l on the first occasion and in 220 l on the second occasion.

Seed: RvP Italian ryegrass at 40 kg, sown 16 Sept, 1974.

Cultivations, etc.:- Both series.
Chalk applied: 26 Aug, 1976. Weedkiller applied: 13 Oct, 12 Apr, 1977.
N applied: 29 Mar, 21 July, 15 Aug. Cut twice: 21 June, 9 Aug.

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77/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 22nd year of the rotation, barley, ley, potatoes, winter wheat, kale.
The 18th year of the same rotation on the additional plots.
The 21st 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 69-76/R/RN/5.

Design: 1 block of 12 plots for each crop on original plots. 1 block of 7 plots for each crop on additional plots.

Whole plot dimensions: 2.13 x 2.44.

Treatments: Fertilisers and farmyard manure:

MANURE

Original plots

0
N1
P
N1P
K
N1K
PK
N1PK
N2PK
D
N1PKD
N2PKD

N1, 2 (kg N): 19, 38 (ley): 56, 112 (barley): 75, 150 (wheat): 125, 250 (potatoes - 75, 150 until 1975): 125, 250 (kale and permanent grass) as 'Nitro-Chalk'
P: 63 kg P205 as superphosphate
K: 250 kg K20 as muriate of potash
D: 38 tonnes FYM (permanent grass): 50 tonnes (kale and potatoes): none to other crops.

NOTE: Since 1977 all wheat on these plots receives a standard dressing of 82 kg MgO as Epsom salts. Before 1976 potatoes tested 0 v 82 kg MgO on sub plots, dressing balanced-up after harvest before wheat. Reference in the 1976 'Yields' to potatoes receiving a standard dressing of Mg in that year was incorrect, no Mg was applied.

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Additional plots

MANURE

0	None
F	N PK
FMGCA	N PK Mg Ca
FMGS	N PK Mg S
FCAS	N PK Ca S
FMGCAS	N PK Mg Ca S
FMGCASTE	N PK Mg Ca S TE

F: N PK
N: N applied as urea. N1 to wheat, N2 to other crops. Rates as above.
P: 126 kg P205 as potassium dihydrogen phosphate
K: 251 kg K20 total. As potassium dihydrogen phosphate (83 kg K20) on all NPK plots. In addition plots without S receive 168 kg K20 as potassium chloride, plots with S receive 92 kg K20 as potassium sulphate plus 76 kg K20 as potassium chloride.
Mg: 126 kg MgO as magnesium chloride
Ca: 126 kg CaO as calcium carbonate
S: 30 kg S supplied by potassium sulphate
TE: Trace element mixture including Mn, Cu, Zn, B, Mo, Ca, Fe. Test varies with crop.

Standard applications:
Barley: Weedkillers: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 280 l. Fungicide: Tridemorph at 0.53 kg in 280 l.
Potatoes: Weedkillers: Linuron at 0.93 kg plus paraquat at 0.28 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 280 l, (applied twice to original plots). Insecticide: Menazon at 0.28 kg applied with the first fungicide spray.
Winter wheat: Weedkillers: Ioxynil at 0.47 kg with mecoprop at 1.4 kg in 280 l.

Seed: Barley: Maris Mink, sown at 200 kg.
Grass-clover ley: RvP Italian ryegrass and Hungaropoly red clover.
Potatoes: Pentland Crown.
Winter wheat: Maris Fundin, sown at 220 kg.
Kale: Thousand-headed.

Cultivations, etc.:-
Barley: Original plots dug by hand: 8 Nov, 1976. Additional plots dug by hand: 18 Nov. P, K, Mg, Ca and S applied: 3 Mar, 1977. N applied and seed sown: 9 Mar. Weedkillers applied: 6 May. Trace elements applied: 2 June. Fungicide applied: 20 June. Additional plots harvested by hand: 16 Aug. Original plots harvested by hand: 23 Aug.
Grass-clover ley: Rotary cultivated and seed sown: 4 Aug, 1976. P, K applied to original plots: 19 Nov. P, K, Mg, Ca and S applied to additional plots: 8 Dec. N applied: 3 Mar, 1977. Trace elements applied: 19 Apr. Cut three times: 18 May, 11 July, 26 Sept.

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Potatoes: FYM applied and dug by hand: 17 Sept, 1976. P, K, Mg, Ca and S applied: 3 Mar, 1977. N applied, rotary cultivated and planted: 25 Apr. Weedkillers applied: 23 May. Second N applied to additional plots: 2 June. Trace elements applied: 20 June. Fungicide with insecticide applied: 30 June. Plots of the original plots with neither K nor FYM and no fertiliser plot of the additional plots lifted: 1 Aug. Fungicide applied to remaining original plots: 7 Sept. Remaining plots lifted: 6 Oct.

Winter wheat: Dug by hand: 14 Sept, 1976. Test P, K, Mg, Ca and S and basal Mg to original plots applied: 27 Sept. Seed sown: 8 Oct. Weedkillers applied: 9 Mar, 1977. N and trace elements applied: 19 Apr. Additional plots harvested by hand: 16 Aug. Remaining plots harvested by hand: 23 Aug.

Kale: Additional plots dug by hand: 16 Sept, 1976. FYM applied and remaining plots dug by hand: 11 Oct. P, K, Mg, Ca and S applied: 3 Mar, 1977. N applied and seed sown: 5 Apr. Second N applied to additional plots: 2 June. Trace elements applied: 20 June. Harvested by hand: 24 Oct.

Permanent grass: P and K applied: 19 Nov, 1976. FYM applied: 3 Mar, 1977. N applied: 3 Mar, 18 May, 11 July. Cut three times: 18 May, 11 July, 30 Sept.

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77/R/RN/5

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT: GRAIN	WINTER WHEAT: STRAW	KALE: FRESH WEIGHT	BARLEY: GRAIN	BARLEY: STRAW	LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE									
0	2.80	2.79	15.7	3.08	2.16	2.02	1.10	0.92	4.04
N1	3.12	3.57	19.2	3.96	3.70	3.02	1.66	0.65	5.33
P	3.52	4.08	26.2	3.20	2.50	2.33	1.20	0.56	4.10
N1P	1.35	2.29	38.4	3.69	3.79	3.35	1.49	0.53	5.38
K	4.31	5.28	6.1	3.14	2.34	2.15	1.46	1.47	5.09
N1K	6.19	7.18	7.4	4.70	3.82	3.13	1.97	1.34	6.44
PK	4.43	5.46	15.7	3.94	2.20	2.75	2.09	3.16	8.00
N1PK	7.30	8.57	49.3	5.21	4.05	4.09	1.89	2.42	8.40
N2PK	6.95	8.37	63.2	6.35	5.30	5.62	2.40	1.20	9.23
D	5.01	5.66	39.7	4.13	3.20	3.14	2.17	2.08	7.39
N1PKD	7.19	9.33	64.5	6.30	4.85	5.16	2.29	2.02	9.47
N2PKD	7.78	10.06	83.7	6.22	5.58	5.22	2.76	1.75	9.73
MEAN DM%	75.7	66.2		76.6	64.0	23.7	27.6	22.3	24.5

	POTATOES: TOTAL TUBERS	PERMANENT GRASS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE					
0	6.1	0.33	1.39	1.12	2.84
N1	7.4	0.68	1.37	1.59	3.64
P	5.0	0.39	1.28	0.95	3.62
N1P	6.4	1.11	1.53	1.98	4.62
K	25.4	0.48	1.35	1.22	3.05
N1K	41.0	1.61	2.64	2.31	6.56
PK	29.0	0.37	1.43	1.21	3.02
N1PK	49.8	2.14	2.79	2.36	7.30
N2PK	55.1	3.37	2.51	2.82	8.70
D	36.7	3.10	1.83	1.93	6.87
N1PKD	57.1	4.16	2.11	2.59	8.86
N2PKD	59.4	3.92	4.35	3.59	11.86
MEAN DM%		24.8	28.4	26.1	26.4

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GREAT FIELD IV (R) : ADDITIONAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT: GRAIN	STRAW	KALE: FRESH WEIGHT	BARLEY: GRAIN	STRAW	POTATOES: TOTAL TUBERS
MANURE						
0	2.83	3.15	27.5	2.88	2.63	8.7
F	8.69	10.45	69.8	6.72	6.17	59.8
FMGCA	8.28	10.26	70.6	6.91	6.22	58.0
FMGS	8.14	9.17	75.9	6.90	6.12	63.6
FCAS	7.40	8.22	67.1	6.78	6.58	60.3
FMGCAS	7.98	9.35	69.8	6.47	6.08	60.0
FMGCASTE	8.34	9.30	75.4	6.71	6.08	57.6
MEAN DM%	78.9	69.7		80.9	73.5	

	LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE				
0	2.08	1.08	0.71	3.86
F	5.54	2.37	1.43	9.34
FMGCA	4.98	2.74	2.01	9.73
FMGS	4.80	1.76	1.10	7.66
FCAS	5.34	2.51	1.97	9.82
FMGCAS	5.29	2.50	2.23	10.03
FMGCASTE	5.48	2.36	2.06	9.90
MEAN DM%	22.1	28.1	21.8	24.0

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77/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 18th year, oats, sugar beet, barley, ley, potatoes, permanent 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 71-76/W/RN/6.

Design: 1 block of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks

1. CROP		Crops:-
		After old grass (1960-73):
	OATS/G	Oats
		In arable rotation since 1960:
	BARLEY	Barley
	LEY	Ley
	POTATO	Potatoes
	SUGRBEET	Sugar beet
	OATS/A	Oats
	PERMGRAS	Permanent grass, sown autumn 1973

Plots

2. MANURE — Fertilisers and farmyard manure:-

0
N1
P
N1P
K
NIK
PK
N1PK
N2PK
D
N1PKD
N2PKD

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.
P: P205 at 63 kg as triple superphosphate.
K: K20 at 252 kg as potassium bicarbonate.
D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

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NOTES: (1) The old grass block was dug in autumn 1973 and follows the arable rotation, the crop in 1977 being oats. A new block was sown to permanent grass on adjacent land.
(2) Potatoes and sugar beet test on sub plots: - v MG (82 kg MgO as Epsom salts). Yields are recorded from potatoes only. Untreated sub plots receive 82 kg MgO after potato and sugar beet harvest.

Standard applications:
Winter oats After old grass and in rotation: Weedkillers: Ioxynil at 0.42 kg plus mecoprop at 1.3 kg in 280 l on two occasions.
Sugar beet: Manures: Boron at 0.92 kg B_2O_3 as borax in 1120 l. Insecticides: Menazon at 0.28 kg in 280 l. Pirimicarb at 0.14 kg in 280 l.
Barley: Weedkillers: Ioxynil at 0.42 kg plus mecoprop at 1.3 kg in 280 l.
Potatoes: Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 280 l on three occasions, the first with insecticide. Insecticide: Menazon at 0.28 kg with fungicide.

Seed: Winter oats: Peniarth, sown at 200 kg
Sugar beet: Klein E, sown at 5.6 kg
Barley: Julia, dressed with ethirimol, sown at 220 kg
Potatoes: Pentland Crown
Grass-clover ley: RvP Italian ryegrass and Hungaropoly red clover
Permanent grass: S215 Meadow fescue at 20 kg; S24 perennial ryegrass at 20 kg; crested dogstail at 7 kg; Chewings fescue at 7 kg; smooth stalked meadow grass at 7 kg; alsike clover at 4 kg; wild white clover at 2 kg. Mixture sown at 67 kg.

Cultivations, etc.:-
Winter Oats: Both blocks: Balancing Mg applied to oats after long ley only, plots dug by hand, P and K applied: 7 Sept, 1976. Raked, seed sown: 20 Oct. First half N applied, weedkillers applied: 11 Mar, 1977. Second half N applied: 3 May. Weedkiller application repeated: 10 May. Harvested: 3 Aug.
Sugar beet: FYM applied, plots dug by hand: 11 Nov, 1976. P and K applied: 2 Mar, 1977. First half N applied, raked, Mg applied to half plots, raked in, seed drilled and raked in: 25 Mar. Singled, second half N applied, boron applied: 9 June. Menazon applied: 7 July. Pirimicarb applied: 19 July. Lifted: 10 Nov.
Barley: Balancing Mg applied: 7 Oct, 1976. Plots dug by hand: 18 Nov. First half N applied, P and K applied, raked, seed sown, raked in: 2 Mar, 1977. Second half N applied: 3 May. Weedkillers applied: 10 May. Harvested: 11 Aug.
Potatoes: FYM applied, plots dug by hand: 11 Nov, 1976. P and K applied: 2 Mar, 1977. First half N applied, rotary cultivated, raked, Mg applied to half plots, potatoes planted and earthed up: 26 Apr. Weedkillers applied: 23 May. Second half N applied: 9 June. Insecticide with fungicide applied: 7 July. Fungicide applied: 26 July, 11 Aug. Lifted plots without K: 3 Aug. Remaining plots lifted: 3 Oct.
Grass-clover ley: Barley stubble raked, seeds sown, raked in: 5 Aug, 1976. P and K applied: 18 Nov. N applied: 11 Mar, 1977. Cut three times: 23 May, 19 July, 29 Sept.
Permanent Grass: P and K applied: 18 Nov, 1976. FYM applied: 2 Mar, 1977. N applied in three equal amounts: 11 Mar, 23 May, 19 July. Cut three times: 23 May, 19 July, 29 Sept.

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

TONNES/HECTARE

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

	OATS/A		OATS/G		ROOTS	SUGRBEET SUGAR %	SUGRBEET TOTAL SUGAR	TOPS
	GRAIN	STRAW	GRAIN	STRAW	WASHED			
MANURE								
0	0.80	0.94	1.73	2.08	12.6	16.6	2.10	8.2
N1	2.63	2.90	3.71	4.04	19.1	16.3	3.12	21.9
P	0.98	1.17	1.83	2.46	10.6	16.3	1.72	9.2
N1P	3.55	4.08	3.31	3.88	15.7	15.6	2.45	17.4
K	0.92	1.24	1.74	2.28	13.0	17.1	2.22	8.5
N1K	2.89	4.06	3.66	5.06	32.3	17.3	5.60	20.5
PK	0.88	1.34	1.70	2.32	14.2	17.1	2.42	8.4
N1PK	2.46	3.73	3.64	5.29	32.8	16.8	5.51	25.1
N2PK	3.80	6.20	4.76	6.79	38.3	16.5	6.32	40.2
D	1.64	2.28	1.95	2.79	33.3	17.2	5.73	22.2
N1PKD	1.90	2.88	3.55	6.12	46.8	17.6	8.24	35.9
N2PKD	3.82	6.55	4.27	6.59	51.8	16.8	8.68	50.9
MEAN DM%	76.3	49.1	74.4	47.3				

	BARLEY		LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS	POTATOES TOTAL TUBERS -	MG	MEAN
	GRAIN	STRAW							
MANURE									
0	1.41	1.20	0.53	0.37	0.31	1.22	7.5	5.8	6.7
N1	2.96	2.92	2.44	0.76	0.34	3.53	8.2	7.9	8.0
P	1.61	1.33	0.49	0.41	0.26	1.17	7.2	6.2	6.7
N1P	1.73	2.60	2.65	0.60	0.32	3.56	7.9	7.5	7.7
K	1.76	1.57	0.74	0.41	0.68	1.84	11.3	9.9	10.6
N1K	3.54	3.79	2.78	0.67	0.59	4.04	27.0	32.1	29.6
PK	1.50	1.30	0.88	0.60	0.95	2.43	16.1	16.7	16.4
N1PK	3.64	3.57	3.31	0.66	0.57	4.54	31.4	32.8	32.1
N2PK	4.88	5.96	4.76	1.10	0.55	6.41	27.3	36.9	32.1
D	2.20	2.04	1.58	0.94	1.06	3.57	26.0	28.7	27.3
N1PKD	4.68	4.44	4.12	0.98	0.90	6.00	36.9	41.3	39.1
N2PKD	4.99	5.82	6.02	1.58	0.76	8.37	53.6	56.7	55.2
MEAN DM%	79.2	70.2	27.1	33.9	23.2	28.1			

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77/W/RN/6

TONNES/HECTARE

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

PERMGRAS : DRY MATTER

	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE				
0	1.49	0.38	0.58	2.45
N1	3.75	1.62	2.23	7.60
P	1.03	0.22	0.43	1.69
N1P	3.57	1.50	1.96	7.03
K	2.04	0.84	0.99	3.87
N1K	4.21	1.86	2.10	8.17
PK	1.79	0.50	0.83	3.12
N1PK	4.46	1.80	2.24	8.50
N2PK	4.68	1.89	2.44	9.00
D	3.36	0.96	1.06	5.38
N1PKD	5.54	1.89	2.57	10.01
N2PKD	5.66	2.11	2.96	10.73
MEAN DM%	23.1	33.5	23.8	26.8

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77/R/RN/7

RESIDUAL PHOSPHATE

Object: Originally to study the fresh and residual effects of phosphate fertiliser on the yields of three arable crops grown in rotation. Since 1974 the effects on ley and on yield and pathogens of continuous wheat are also studied - Great Field IV and Sawyers I.

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

The 18th year, ley (Great Field IV): wheat (Sawyers I).

For previous years see 'Details' 1967 and 1973 and 74-76/R/RN/7.

Design: Great Field IV: 3 series each of 1 randomised block of 12 plots.
Sawyers I: 3 series each of 2 randomised blocks of 12 plots.

Whole plot dimensions:
Great Field IV: 4.27 x 18.3
Sawyers I: 4.27 x 20.1

Treatments:

P205	Rates and frequency of applying phosphate:-
NONE	0
	Annual dressings, kg P205:
29 ANN	29
57 ANN	57
115 ANN	115
172 ANN	172
	Triennial dressings, kg P205 (last applied 1975):
86 TRI	86
172 TRI	172
	Six-yearly dressings, kg P205 (last applied 1973):
344 SIX	344
688 SIX	688
1032 SIX	1032
	Single dressing, kg P205 (applied autumn 1959):
376 G(1)	376 as Gafsa rock phosphate
376 S(1)	376 as granular superphosphate

NOTES: (1) Since 1974 the original rotation of potatoes, barley, swedes on both fields has been changed. Blocks after barley have been sown to continuous wheat on Sawyers I, to ley on Great Field IV.
(2) Since 1960 all phosphate has been applied as superphosphate.
(3) The six-yearly dressings were applied half in autumn before ploughing, half in spring.

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77/R/RN/7

Standard applications:
Leys (Great Field IV only): Manures: K20 at 250 kg as muriate of potash.
Wheat (Sawyers I only): Manures: K20 at 90 kg as muriate of potash. 'Nitro-Chalk' at 500 kg. Weedkillers: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 220 l.

Seed: Wheat: Cappelle, sown at 190 kg.

Cultivations, etc.:-
Leys: Standard K applied: 14 Dec, 1976. Treatment P applied: 3 Mar. Cut three times: 25 May, 20 July, 24 Nov.
Wheat: Ploughed: 30 Sept, 1976. Heavy spring-tine cultivated: 3 Nov. Standard K applied: 4 Nov. Treatment P applied: 19 Nov. Seed sown, spring-tine cultivated: 20 Nov. N applied: 13 Apr. Weedkillers applied: 10 May. Combine harvested: 9 Sept.

NOTE: Incidence of take-all was measured in May and July on Sawyers I only.

77/R/RN/7 GREAT FIELD IV

SERIES I

DRY MATTER TONNES/HECTARE

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

	CUT 1 (25/5/77)	CUT 2 (20/7/77)	CUT 3(24/11/77)	TOTAL OF 3 CUTS
P2O5				
NONE	2.28	4.75	1.61	8.64
29 ANN	3.04	4.00	2.10	9.14
57 ANN	3.09	3.24	1.72	8.06
115 ANN	2.93	4.00	2.10	9.03
172 ANN	3.79	4.27	2.20	10.27
86 TRI	3.51	2.77	2.17	8.45
172 TRI	1.96	4.63	1.47	8.06
344 SIX	3.27	3.83	2.07	9.17
688 SIX	3.47	4.10	2.34	9.91
1032 SIX	2.57	4.80	2.11	9.48
376 G(1)	2.38	4.91	2.05	9.34
376 S(1)	2.60	4.35	1.62	8.57
MEAN	2.91	4.14	1.96	9.01
MEAN DM%	21.5	22.8	24.4	22.9

PLOT AREA HARVESTED 0.00186

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77/R/RN/7 GREAT FIELD IV

SERIES II

DRY MATTER TONNES/HECTARE

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

P205	CUT 1 (25/5/77)	CUT 2 (20/7/77)	CUT 3(24/11/77)	TOTAL OF 3 CUTS
NONE	1.49	3.69	0.96	6.13
29 ANN	1.10	4.02	1.45	6.57
57 ANN	1.51	3.24	1.58	6.33
115 ANN	1.21	3.83	1.57	6.61
172 ANN	1.32	3.28	1.41	6.01
86 TRI	1.30	3.39	1.19	5.88
172 TRI	0.96	4.30	1.41	6.67
344 SIX	1.37	3.94	1.30	6.61
688 SIX	1.53	3.91	1.37	6.82
1032 SIX	0.89	3.24	0.91	5.04
376 G(1)	1.24	3.57	1.03	5.83
376 S(1)	1.61	4.41	1.27	7.30
MEAN	1.29	3.73	1.29	6.32
MEAN DM%	24.5	24.1	22.3	23.6

PLOT AREA HARVESTED 0.00186

SERIES III

DRY MATTER TONNES/HECTARE

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

P205	CUT 1 (25/5/77)	CUT 2 (20/7/77)	CUT 3(24/11/77)	TOTAL OF 3 CUTS
NONE	1.44	4.27	0.67	6.37
29 ANN	1.17	3.50	1.10	5.77
57 ANN	1.42	4.17	1.60	7.20
115 ANN	1.65	4.10	1.50	7.25
172 ANN	1.06	1.74	1.28	4.08
86 TRI	1.38	3.45	1.13	5.96
172 TRI	1.01	3.07	1.53	5.62
344 SIX	1.47	3.55	1.15	6.18
688 SIX	1.33	4.26	1.42	7.01
1032 SIX	1.09	2.29	1.05	4.43
376 G(1)	1.40	3.63	1.09	6.12
376 S(1)	1.24	3.70	0.71	5.65
MEAN	1.30	3.48	1.19	5.97
MEAN DM%	25.0	24.3	21.7	23.7

PLOT AREA HARVESTED 0.00186

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77/R/RN/7 SAWYERS I

SERIES I 3RD CEREAL WHEAT

GRAIN TONNES/HECTARE

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

P2O5	
NONE	5.29
29 ANN	5.76
57 ANN	6.09
115 ANN	6.02
172 ANN	5.60
86 TRI	6.12
172 TRI	6.12
344 SIX	5.38
688 SIX	5.88
1032 SIX	6.12
376 G(1)	5.61
376 S(1)	5.55
MEAN	5.80

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

TABLE	P2O5
SED	0.420

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.420	7.3

GRAIN MEAN DM% 81.1

STRAW TONNES/HECTARE

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

P2O5	
NONE	4.46
29 ANN	4.51
57 ANN	5.07
115 ANN	4.78
172 ANN	5.29
86 TRI	4.69
172 TRI	4.95
344 SIX	4.58
688 SIX	5.20
1032 SIX	5.22
376 G(1)	4.43
376 S(1)	4.21
MEAN	4.78

STRAW MEAN DM% 91.0

PLOT AREA HARVESTED 0.00562

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77/R/RN/7 SAWYERS I

SERIES II 4TH CEREAL WHEAT

GRAIN TONNES/HECTARE

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

	P2O5
NONE	3.27
29 ANN	3.91
57 ANN	4.90
115 ANN	4.65
172 ANN	5.12
86 TRI	4.74
172 TRI	4.01
344 SIX	3.55
688 SIX	4.64
1032 SIX	5.06
376 G(1)	3.07
376 S(1)	3.79
MEAN	4.23

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

TABLE	P2O5
SED	0.569

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.569	13.5

GRAIN MEAN DM% 81.7

STRAW TONNES/HECTARE

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

	P2O5
NONE	2.92
29 ANN	3.51
57 ANN	4.08
115 ANN	4.24
172 ANN	4.16
86 TRI	3.48
172 TRI	3.48
344 SIX	3.36
688 SIX	4.32
1032 SIX	4.25
376 G(1)	3.01
376 S(1)	3.31
MEAN	3.68

STRAW MEAN DM% 91.2

PLOT AREA HARVESTED 0.00562

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77/R/RN/7

SERIES III 5TH CEREAL WHEAT

GRAIN TONNES/HECTARE

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

P2O5	
NONE	4.29
29 ANN	3.89
57 ANN	4.09
115 ANN	3.86
172 ANN	4.32
86 TRI	3.44
172 TRI	4.28
344 SIX	3.56
688 SIX	3.87
1032 SIX	4.31
376 G(1)	3.89
376 S(1)	3.31
MEAN	3.93

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

TABLE	P2O5
SED	0.527

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.527	13.4

GRAIN MEAN DM% 81.8

STRAW TONNES/HECTARE

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

P2O5	
NONE	3.33
29 ANN	3.13
57 ANN	3.44
115 ANN	3.67
172 ANN	3.58
86 TRI	2.84
172 TRI	3.63
344 SIX	3.50
688 SIX	3.34
1032 SIX	3.31
376 G(1)	3.48
376 S(1)	2.85
MEAN	3.34

STRAW MEAN DM% 90.6

PLOT AREA HARVESTED 0.00562

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77/R/RN/8

CULTIVATION/WEEDKILLER

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

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

The 17th year, spring wheat.

For previous years see 'Details' 1967 and 1973 and 74-76/R/RN/8.

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

Whole plot dimensions: 12.8 x 15.2.

Treatments: All combinations of:-

Whole plots

1. CULTIVTN	Primary cultivations annually:
PLOUGH	Ploughed: 20 Oct, 1976
ROTAVATE	Rotary cultivated: 13 Oct
DEEPTINE	Deep-tine cultivated twice: 5 Oct
2. WEEDCNTL(76)	Weed control to beans 1976:
MECHANCL	Mechanical
SIMAZINE	Simazine

Sub plots

3. WEEDKLLR(751)	Hormone weedkiller to previous cereals, last applied to barley 1975 (basal weedkiller 'Banlene Plus' at 4.9 l in 220 l in 1977):
NONE	None
DI+ME+MC	Dicamba + mecoprop + MCPA
4. WEEDKLLR(752)	Paraquat weedkiller to previous cereal stubbles, last applied to barley stubble autumn 1975 (basal weedkiller, glyphosate at 1.7 kg in 220 l to bean stubble 1976):
NONE	
PARAQUAT	
EXTRA	plus three extra whole plot treatments:
SPNGTINE	Heavy spring-tine cultivated twice: 6 Oct, 1976. Given simazine to beans 1976, with sub plot treatments 3 and 4 above.
(SH)PLGH	Shallow ploughed: 7 Oct, 1976. Given simazine to beans 1976 and paraquat to barley stubble autumn 1975, with sub plot treatment 3 above.
STANDARD	Standard cultivations as considered best for each crop. Ploughed 20 Oct, 1976. Given simazine to beans 1976, with sub plot treatments 3 and 4 above.

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77/R/RN/8

NOTE: It was intended to sow winter wheat but prolonged wet weather prevented this.

Basal applications: Manures: (10:24:24) at 250 kg, combine drilled. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Seed: Sappo, sown at 190 kg.

Cultivations, etc.:- Glyphosate applied: 6 Sept, 1976. All plots heavy spring-tine cultivated twice: 25 Nov, 16 Dec. All plots rotary harrowed: 16 Dec. All plots spring-tine cultivated: 4 Apr, 1977. Seed sown: 5 Apr. 'Banlene Plus' applied: 26 May. Insecticide applied: 14 July. Combine harvested: 23 Sept.

EXTRA PLOTS ONLY

GRAIN TONNES/HECTARE

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

	EXTRA	SPNGTINE	(SH)PLGH	STANDARD
WEEDKLLR(751)				
	NONE	4.32	4.77	4.32
	D1+ME+ML	4.82	5.25	4.48
WEEDKLLR(752)				
	NONE	4.62		4.39
	PARAQUAT	4.53	5.01	4.41
	MEAN	4.58	5.01	4.40

GRAIN MEAN DM% 76.3

SUB PLOT AREA HARVESTED 0.00434

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77/R/RN/8

OMITTING EXTRA PLOTS

GRAIN TONNES/HECTARE

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

CULTIVTN	PLOUGH	ROTAVATE	DEEPTINE	MEAN
WEEDCNTL(76)				
MECHANCL	4.26	4.04	4.82	4.37
SIMAZINE	4.70	4.45	4.70	4.62
WEEDKLLR(751)				
NONE	4.62	4.33	4.71	4.55
D1+ME+ML	4.49	4.30	4.77	4.52
WEEDKLLR(752)				
NONE	4.56	4.31	4.78	4.55
PARAQUAT	4.55	4.33	4.70	4.53
MEAN	4.55	4.32	4.74	4.54

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

TABLE	CULTIVTN	WEEDCNTL(76)	WEEDKLLR(751)	WEEDKLLR(752)
SED	0.178	0.154	0.038	0.038

TABLE	CULTIVTN WEEDCNTL(76)	CULTIVTN WEEDKLLR(751)	CULTIVTN WEEDKLLR(752)	
SED	0.309			MIN REP
	0.268	0.184	0.184	MAX-MIN
	0.218			MAX REP

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:

CULTIVTN		0.066	0.066

	WEEDCNTL(76)
MIN REP	MECHANCL
MAX-MIN	MECHANCL V SIMAZINE
MAX REP	SIMAZINE

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.309	6.8
BLOCK.WP.SP	10	0.114	2.5

GRAIN MEAN DM% 76.4

SUB PLOT AREA HARVESTED 0.00434

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77/W/RN/12

ORGANIC MANURING

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

Sponsor: G.E.G. Mattingly.

The 13th year, winter oats, potatoes.

For previous years see 'Details' 1973 and 74-76/W/RN/12.

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

Whole plot dimensions: 8.53 x 30.5.

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

Whole plots

1. MANURE — Organic manures and fertilisers in the preliminary period:

FYM	Farmyard manure
STRAW	Straw
PEAT	Peat
GREENMNR	Green manures
FERT-FYM	Fertilisers equivalent to FYM
FERT-STR	Fertilisers equivalent to straw
CLOVRLEY	Grass/clover ley, no N
GRASSLEY	Grass ley with N for each cut

Sub plots

2. N RES(76) N 77 — Fertiliser nitrogen (kg N) (residues of treatments to barley 1976 on winter oats, fresh dressings 1977 to potatoes):

W. OATS	POTATOES
0	0
25	75
50	150
75	225
100	300
125	375
150	450
175	525

No fresh nitrogen was applied to winter oats 1977. The crop was cut green in July.

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77/W/RN/12

Standard applications:
Winter oats: Manures: (0:20:20) at 290 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 280 l. Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.
Potatoes: Manures: (0:20:20) at 1140 kg in winter. (0:20:20) at 1210 kg in spring. 60 kg Mg as kieserite. Weedkiller: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Seed: Winter oats: Peniarth, sown at 200 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Winter oats: Glyphosate applied: 23 Sept, 1976. Ploughed: 15 Oct. Spring-tine cultivated, seed sown: 8 Nov. Ioxynil plus mecoprop applied: 15 May, 1977. Harvested green: 7-8 July.
Potatoes: Heavy-tine cultivated: 28 July, 1976. Power harrowed: 16 Aug. Ploughed: 15 Oct. Winter PK applied: 17 Jan, 1977. Spring PK and kieserite applied: 6 Apr. Heavy-tine cultivated: 13 Apr. N applied: 19-21 Apr. Power harrowed, potatoes planted: 22 Apr. Grubbed and earthed up, weedkiller applied: 25 May. Fungicide applied: 23 June. Fungicide with insecticide applied: 8 July, 21 July, 12 Aug. Haulm mechanically destroyed: 21 Oct. Lifted: 1 Nov.

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77/W/RN/12

WINTER OATS

GREEN CROP DRY MATTER TONNES/HECTARE

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

N RES(76) / MANURE	0	25	50	75	100	125	150	175	MEAN
FYM	0.99	0.98	1.05	0.98	1.05	1.09	0.86	0.95	0.99
STRAW	0.73	0.77	0.79	0.80	0.76	0.78	0.82	0.77	0.78
PEAT	0.71	0.76	0.81	0.84	0.79	0.84	0.83	0.81	0.80
GREENMNR	0.61	0.74	0.52	0.55	0.72	0.75	0.80	0.77	0.68
FERT-FYM	0.52	0.62	0.59	0.60	0.71	0.63	0.69	0.67	0.63
FERT-STR	0.68	0.80	0.80	0.87	0.86	0.83	0.78	0.82	0.80
CLOVRLEY	0.93	0.90	0.98	1.10	1.04	1.09	1.22	1.13	1.05
GRASSLEY	0.99	1.09	1.12	1.10	1.17	1.03	1.21	1.10	1.10
MEAN	0.77	0.83	0.83	0.86	0.89	0.88	0.90	0.88	0.85

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

TABLE	MANURE	N RES(76)	MANURE N RES(76)
SED	0.097	0.034	0.132
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.096

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.097	11.4
BLOCK.WP.SP	56	0.096	11.2

GREENCROP MEAN DM% 32.7

SUB PLOT AREA HARVESTED 0.00149

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77/W/RN/12

TOTAL TUBERS TONNES/HECTARE

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

N 77 MANURE	0	75	150	225	300	375	450	525	MEAN
FYM	17.1	27.9	37.0	40.3	47.5	48.2	49.2	53.6	40.1
STRAW	18.8	32.6	34.7	45.2	46.3	47.6	48.3	43.7	39.7
PEAT	14.2	23.9	33.7	37.7	39.5	42.6	49.1	51.2	36.5
GREENMNR	15.5	34.3	35.5	43.6	44.5	52.4	49.6	52.0	40.9
FERT-FYM	15.2	26.1	33.1	38.3	40.1	44.9	49.9	45.6	36.6
FERT-STR	14.2	28.6	37.1	37.1	42.9	42.8	43.3	44.3	36.3
CLOVRLEY	24.3	32.8	44.1	54.0	50.4	57.4	55.7	54.3	46.6
GRASSLEY	25.3	38.2	43.8	52.8	54.5	52.4	54.7	52.9	46.8
MEAN	18.1	30.6	37.4	43.7	45.7	48.5	50.0	49.7	40.4

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

TABLE	MANURE	N 77	MANURE N 77
SED	2.44	1.28	4.17
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			3.61

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	2.44	6.0
BLOCK.WP.SP	56	3.61	8.9

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

N 77 MANURE	0	75	150	225	300	375	450	525	MEAN
FYM	81.4	89.3	93.2	93.6	93.0	93.8	95.6	95.2	91.9
STRAW	81.1	85.1	89.8	95.2	94.2	96.2	94.9	93.8	91.3
PEAT	73.6	84.0	91.5	91.9	94.0	95.2	95.2	92.9	89.8
GREENMNR	83.7	89.7	92.0	91.6	93.8	94.2	94.3	94.4	91.7
FERT-FYM	82.5	84.2	90.3	90.2	92.9	91.4	94.2	93.3	89.9
FERT-STR	87.0	89.4	93.0	93.2	93.6	94.1	93.2	94.8	92.3
CLOVRLEY	88.7	89.6	93.5	93.0	95.1	94.7	95.3	96.0	93.2
GRASSLEY	84.4	91.6	93.3	94.1	97.0	95.4	95.8	95.7	93.4
MEAN	82.8	87.9	92.1	92.8	94.2	94.4	94.8	94.5	91.7

SUB PLOT AREA HARVESTED 0.00087

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77/W/RN/13

INTENSIVE CEREALS

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

Sponsors: A.E. Johnston, J. McEwen.

The 12th year, winter wheat, barley.

For previous years see 'Details' 1973 and 74-76/W/RN/13.

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

Whole plot dimensions: 8.53 x 20.4.

Treatments:-
One experiment on winter wheat on part of the site of the classical wheat experiment 1877-1954
One experiment on barley on part of the site of the classical barley experiment 1877-1954
Factors tested on both experiments are the same but crop and nitrogen rates differ. All combinations of:-

Blocks

1. ALDICARB Aldicarb worked into the seedbed (kg):

0
10

Whole plots

2. PREVCROP Previous crops:

	1972	1973	1974	1975	1976
C/C/L/P	C	C	C	L	P
C/L/P/C	C	C	L	P	C
L/P/C/C	C	L	P	C	C
P/C/C/C	L	P	C	C	C
C/C/C/L	P	C	C	C	L
C/C/C/C	C	C	C	C	C

Ley = 1 year ley P = Potatoes C = Cereal: wheat or barley. All plots in cereal only from 1977.

Sub plots

3. N Nitrogen fertiliser (kg N):

Wheat	Barley
63	50
126	100
189	150
252	200

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77/W/RN/13

Standard applications:
Wheat: Manures: (0:20:20) at 290 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 280 l, methabenzthiazuron at 1.6 kg in 280 l, Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.
Barley: Manures: (0:20:20) at 300 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 280 l, Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.

Seed:
Wheat: Cappelle, sown at 210 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- All plots: Glyphosate applied: 24 Sept, 1976. Rotary cultivated grass leys: 1 Nov. Ploughed: 8 Nov.

Wheat: Aldicarb applied, rotary cultivated, seed sown: 24 Nov, 1976. Methabenzthiazuron applied: 25 Nov. N applied: 13 Apr, 1977. Ioxynil plus mecoprop applied: 15 May. Pirimicarb applied: 11 July. Combine harvested: 7 Sept.
Barley: Spring-tine cultivated: 7 Mar, 1977. Aldicarb applied, rotary cultivated, seed sown: 8 Apr. N applied: 13 Apr. Ioxynil plus mecoprop applied: 19 May. The following treatments were combine harvested on 16 Aug:

ALDICARB 0 PREVCROP C/C/C/L N 50, 150, 200	ALDICARB 10 PREVCROP P/C/C/C N 50, 150	ALDICARB 0 PREVCROP C/C/L/P N 100, 200	ALDICARB 10 PREVCROP C/L/P/C N 100, 150

Remaining treatments combine harvested: 30 Aug.

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77/W/RN/13

WINTER WHEAT

GRAIN TONNES/HECTARE

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

PREVCROP ALDICARB	C/C/L/P	C/L/P/C	L/P/C/C	P/C/C/C	C/C/C/L	C/C/C/C	MEAN
0	3.79	3.58	3.38	2.84	3.44	3.26	3.38
10	3.89	3.65	3.43	2.37	2.70	2.90	3.16
MEAN	3.84	3.62	3.41	2.61	3.07	3.08	3.27

N ALDICARB	63	126	189	252	MEAN
0	3.15	3.48	3.56	3.34	3.38
10	2.81	3.55	3.17	3.10	3.16
MEAN	2.98	3.51	3.36	3.22	3.27

N PREVCROP	63	126	189	252	MEAN
C/C/L/P	3.55	4.39	3.76	3.66	3.84
C/L/P/C	3.51	4.07	3.60	3.28	3.62
L/P/C/C	2.94	3.50	3.65	3.54	3.41
P/C/C/C	1.98	2.64	2.88	2.93	2.61
C/C/C/L	2.90	3.31	3.00	3.08	3.07
C/C/C/C	3.02	3.18	3.28	2.85	3.08
MEAN	2.98	3.51	3.36	3.22	3.27

N ALDICARB	PREVCROP	63	126	189	252
0	C/C/L/P	3.57	4.10	3.68	3.82
	C/L/P/C	3.53	3.86	3.51	3.42
	L/P/C/C	2.79	3.60	3.53	3.59
	P/C/C/C	2.39	2.72	3.18	3.07
	C/C/C/L	3.15	3.57	3.80	3.26
	C/C/C/C	3.50	3.02	3.64	2.90
10	C/C/L/P	3.53	4.69	3.85	3.49
	C/L/P/C	3.49	4.28	3.70	3.14
	L/P/C/C	3.09	3.40	3.76	3.49
	P/C/C/C	1.57	2.56	2.58	2.79
	C/C/C/L	2.66	3.05	2.21	2.90
	C/C/C/C	2.55	3.34	2.92	2.81

GRAIN MEAN DM% 82.6

SUB PLOT AREA HARVESTED 0.00277

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77/W/RN/13

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	C/C/L/P	C/L/P/C	L/P/C/C	P/C/C/C	C/C/C/L	C/C/C/C	MEAN
ALDICARB							
0	4.26	4.36	4.49	4.22	4.53	4.06	4.32
10	4.29	4.74	4.48	4.02	4.31	3.82	4.28
MEAN	4.28	4.55	4.48	4.12	4.42	3.94	4.30

N	50	100	150	200	MEAN
ALDICARB					
0	3.35	4.60	4.67	4.67	4.32
10	2.95	4.65	4.98	4.53	4.28
MEAN	3.15	4.63	4.82	4.60	4.30

N	50	100	150	200	MEAN
PREVCROP					
C/C/L/P	3.15	4.62	4.58	4.76	4.28
C/L/P/C	3.88	5.07	4.97	4.29	4.55
L/P/C/C	3.45	4.81	4.97	4.71	4.48
P/C/C/C	2.82	4.33	5.16	4.19	4.12
C/C/C/L	2.83	4.82	4.98	5.06	4.42
C/C/C/C	2.78	4.11	4.28	4.59	3.94
MEAN	3.15	4.63	4.82	4.60	4.30

N		50	100	150	200
ALDICARB	PREVCROP				
0	C/C/L/P	3.49	4.58	4.31	4.67
	C/L/P/C	3.70	4.70	4.65	4.40
	L/P/C/C	3.85	4.65	4.63	4.82
	P/C/C/C	3.38	4.46	4.72	4.34
	C/C/C/L	2.78	4.94	5.05	5.34
	C/C/C/C	2.91	4.27	4.63	4.42
10	C/C/L/P	2.82	4.66	4.84	4.86
	C/L/P/C	4.06	5.43	5.29	4.17
	L/P/C/C	3.05	4.97	5.31	4.60
	P/C/C/C	2.26	4.20	5.60	4.04
	C/C/C/L	2.87	4.70	4.90	4.78
	C/C/C/C	2.64	3.95	3.93	4.76

GRAIN MEAN DM% 81.7

SUB PLOT AREA HARVESTED 0.00277

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77/W/RN/14

LONG TERM PHOSPHATE

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

Sponsor: G.E.G. Mattingly.

The tenth year, clover/grass ley.

For previous years see 68/B/8(t), 69/W/RN/14, 70/W/RN/14(t), 71/W/RN/14(t), 72/W/RN/14(t) and 73-76/W/RN/14.

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

Whole plot dimensions: 8.53 x 15.8.

Treatments: All combinations of:-

Whole plots

1. P205RES(73) Residues of superphosphate applied autumn 1967 and spring 1973 (kg P205):

	1967	1973	Total	
0	None	None	None	(Duplicate plots)
360	188	172	360	
720	376	344	720	
1440	753	687	1440	
2160	1130	1030	2160	

Sub plots

2. P205RES(72) Residues of superphosphate applied in three equal dressings 1970-72 (kg P205, total):

0
376

Basal applications: Manures: Ground chalk at 2.5 tonnes. K20 at 110 kg as muriate of potash. MgO at 30 kg as Epsom Salts. K20 at 50 kg as muriate of potash.

Cultivations, etc.:- Ground chalk applied: 3 Sept, 1976. Mg and first K applied: 18 Jan, 1977. Cut once: 22-23 June. Second K applied: 19 July.

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77/W/RN/14

1ST AND ONLY CUT (22/6/77) DRY MATTER TONNES/HECTARE

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

P205RES(73) / P205RES(72)	0	360	720	1440	2160	MEAN
0	2.86	2.80	3.14	2.92	2.18	2.79
376	3.86	2.85	3.09	2.60	2.24	3.08
MEAN	3.36	2.82	3.11	2.76	2.21	2.94

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

TABLE	P205RES(73)	P205RES(72)	P205RES(73) P205RES(72)	
SED	0.384		0.447	MIN REP
	0.332	0.132	0.387	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.323	MIN REP
			0.228	MAX REP

	P205RES(73)
MAX REP	0
MAX-MIN	0 V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.665	22.6
BLOCK.WP.SP	31	0.559	19.0

1ST CUT MEAN DM% 32.8

SUB PLOT AREA HARVESTED 0.00145

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77/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, A.G. Whitehead, T.D. Williams.

The ninth year, potatoes, barley, sugar beet.

For previous years see 'Details' 1973 and 74-76/W/RN/15.

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

Whole plot dimensions: 5.33 x 31.1.

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

Whole plots

1. N — Nitrogen fertiliser (kg N), applied cumulatively:

Potatoes and S.Beet	Barley
75	38
150	75
225	113

Sub plots

2. CHEMICAL — Chemicals:

0	None
A (P)	Aldicarb at 6 kg before potatoes
A (SB)	Aldicarb at 6 kg before sugar beet
A (B)	Aldicarb at 6 kg before barley
A (ALL)	Aldicarb at 6 kg before all crops
A D(ALL)	Aldicarb at 6 kg before all crops in 1977. Dazomet at 224 kg before all crops 1970-76
BEN(ALL)	Benomyl at 22 kg before all crops since 1974 only

NOTE: Aldicarb was first used in 1976. From 1969-75 dichloropropane/dichloropropene ('D-D') was applied at 448 kg to CHEMICAL A (P), A (SB), A (B) and A (ALL).

Standard applications:
Potatoes: Manures: (0:14:28) at 1080 kg. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

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77/W/RN/15

Barley: Manures: (0:20:20) at 310 kg. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 420 l.
Sugar beet: Manures: Magnesian limestone at 2.5 tonnes. (0:14:28) at 1080 kg. Boron at 7.4 kg B_2O_3 (as 'Solubor') applied with insecticide.
Insecticide: Pirimicarb at 0.14 kg in 280 l.

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

Cultivations, etc.:-
All series: Ploughed: 26 Nov, 1976. Aldicarb and benomyl applied, and all plots rotary cultivated: 15 Mar, 1977 (Barley), 15 Apr (Potatoes, sugar beet).
Potatoes: PK applied: 6 Apr, 1977. N applied: 7 Apr. Potatoes planted: 15 Apr. Grubbed: 2 May. Fine tooth cultivated and grubbed twice: 25-26 May. Grubbed and earthed up: 20 June. Fungicide applied four times: 24 June, 8 July, 21 July, 12 Aug. Insecticide applied three times: 8 July, 21 July, 12 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 4 Oct.
Barley: Spring-tine cultivated: 15 Mar, 1977. N applied, spring-tine cultivated with crumbler attached: 30 Mar. Spring-tine cultivated with crumbler attached, seed sown: 4 Apr. Weedkillers applied: 30 May. Combine harvested: 4 Sept.
Sugar beet: Magnesian limestone applied: 6 Sept, 1976. PK applied: 6 Apr, 1977. N applied: 7 Apr. Spring-tine cultivated with crumbler attached, seed sown: 15 Apr. Tractor hoed: 27 May. Singled: 8-9 June. Steerage hoed: 27 June. Hand hoed: 11 July. Insecticide and boron applied: 18 July. Lifted: 11 Nov.

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

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77/W/RN/15

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

N / CHEMICAL	75	150	225	MEAN
0	7.1	27.7	26.2	20.3
A (P)	18.4	34.0	35.7	29.4
A (SB)	13.0	20.1	36.3	23.1
A (B)	11.0	28.2	30.7	23.3
A (ALL)	20.6	30.5	41.0	30.7
A D(ALL)	21.0	37.3	44.2	34.2
BEN(ALL)	19.1	23.0	30.8	24.3
MEAN	15.7	28.7	35.0	26.5

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

TABLE	CHEMICAL	N* CHEMICAL
SED	2.98	5.16

* WITHIN SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	5.16	19.5

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

N / CHEMICAL	75	150	225	MEAN
0	56.9	85.4	85.5	75.9
A (P)	82.2	90.7	93.0	88.6
A (SB)	77.2	88.1	91.4	85.6
A (B)	73.3	91.1	92.7	85.7
A (ALL)	82.3	91.4	92.3	88.7
A D(ALL)	88.1	90.5	93.6	90.7
BEN(ALL)	81.1	88.8	91.9	87.3
MEAN	77.3	89.4	91.5	86.1

SUB PLOT AREA HARVESTED 0.00052

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77/W/RN/15

BARLEY

GRAIN TONNES/HECTARE

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

N CHEMICAL	38	75	113	MEAN
0	2.13	3.17	2.85	2.72
A (P)	2.35	3.08	3.44	2.96
A (SB)	2.03	3.49	3.47	2.99
A (B)	2.03	2.68	3.35	2.68
A (ALL)	1.51	3.56	2.82	2.63
A D(ALL)	1.94	3.06	3.45	2.82
BEN(ALL)	2.04	3.19	2.74	2.66
MEAN	2.00	3.18	3.16	2.78

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

TABLE	CHEMICAL	N* CHEMICAL
SED	0.201	0.349

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.349	12.6

GRAIN MEAN DM% 79.4

STRAW TONNES/HECTARE

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

N CHEMICAL	38	75	113	MEAN
0	1.23	1.91	1.65	1.60
A (P)	1.12	1.43	2.09	1.55
A (SB)	1.08	1.98	1.94	1.67
A (B)	1.29	1.57	1.70	1.52
A (ALL)	0.99	2.07	1.87	1.64
A D(ALL)	1.27	1.85	2.01	1.71
BEN(ALL)	1.22	1.70	1.50	1.47
MEAN	1.17	1.79	1.82	1.59

STRAW MEAN DM% 79.4

SUB PLOT AREA HARVESTED 0.00052

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77/W/RN/15

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

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

N / CHEMICAL	75	150	225	MEAN
0	22.0	32.9	34.7	29.8
A (P)	24.6	38.8	36.7	33.4
A (SB)	30.4	40.6	41.0	37.3
A (B)	27.1	35.2	38.6	33.6
A (ALL)	28.6	36.4	40.5	35.2
A D(ALL)	32.3	35.1	36.4	34.6
BEN(ALL)	25.9	31.8	34.0	30.6
MEAN	27.3	35.8	37.4	33.5

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

TABLE	CHEMICAL	N* CHEMICAL
SED	2.04	3.54

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	3.54	10.6

SUGAR PERCENTAGE

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

N / CHEMICAL	75	150	225	MEAN
0	18.8	18.2	17.6	18.2
A (P)	18.7	18.4	17.6	18.3
A (SB)	18.8	18.4	17.6	18.2
A (B)	18.8	18.4	17.7	18.3
A (ALL)	18.7	18.1	17.7	18.2
A D(ALL)	18.7	18.0	17.3	18.0
BEN(ALL)	18.8	18.1	17.7	18.2
MEAN	18.7	18.2	17.6	18.2

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77/W/RN/15

SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

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

N CHEMICAL	75	150	225	MEAN
0	4.13	5.98	6.10	5.40
A (P)	4.61	7.15	6.47	6.08
A (SB)	5.70	7.47	7.22	6.79
A (B)	5.08	6.46	6.82	6.12
A (ALL)	5.35	6.58	7.17	6.37
A D(ALL)	6.05	6.32	6.30	6.22
BEN(ALL)	4.87	5.76	6.01	5.55
MEAN	5.11	6.53	6.58	6.08

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

TABLE	CHEMICAL	N* CHEMICAL
SED	0.392	0.680

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.680	11.2
SUB PLOT AREA HARVESTED	0.00130		

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77/W/RN/16

EFFECTS OF DEEP PK

Object: To study the residual effects of subsoiling, and of incorporating a large dressing of PK in either the subsoil or topsoil, on yields of a rotation of crops - Woburn Butt Furlong.

Sponsor: J. McEwen.

The fourth year, winter wheat, sugar beet, spring barley, potatoes.

For previous years see 74-76/W/RN/16.

Design: 4 series of 3 randomised blocks of 4 plots.

Whole plot dimensions: 4.27 x 2.59.

Treatments: Extra PK and subsoil treatment (applied autumn 1973):

PK SUB	Extra PK	Subsoil (25-50 cm) treatment
- -	None	None
- SUB	None	Subsoiled
PKTOP -	To topsoil (0-25 cm)	None
- PKSUB	To subsoil	Subsoiled

NOTES: (1) The rates of P and K were 1930 kg P205, as superphosphate and 460 kg K20 as muriate of potash. These quantities, applied to subsoil, were chosen to equalize available P and K in top and subsoil.
(2) Subsoiling was done by spade, after removing the topsoil which was then replaced. PK to subsoil was worked in by forking.
(3) PK to topsoil was applied half before ploughing in autumn half soon after on the plough furrow.

Standard applications:
Series II: Winter wheat: Manures: (0:20:20) at 290 kg combine drilled. N at 100 kg as 'Nitro-Chalk'.
Series III: Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg. N at 170 kg as 'Nitro-Chalk'.
Series IV: Barley: Manures: (20:14:14) at 380 kg combine drilled. Weedkillers: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l.
Series I: Potatoes: Manures: (13:13:20) at 1860 kg. Weedkillers: Linuron at 1.1 kg plus paraquat at 0.42 kg ion in 340 l.

Seed: Winter wheat: Cappelle, sown at 210 kg.
Sugar beet: Klein E, sown at 5.6 kg.
Barley: Julia, dressed with ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Series II: Winter wheat: Ploughed, spring-tine cultivated with crumbler attached, seed sown: 9 Nov, 1976. N applied: 12 Apr, 1977. Hand weeded twice: 31 May, 4 June. Hand harvested: 30 Aug.
Series III: Sugar beet: Magnesian limestone applied: 6 Sept, 1976. Ploughed: 9 Nov. PK and N applied: 13 Apr, 1977. Spring-tine cultivated with crumbler attached, seed sown: 15 Apr. Hand weeded: 31 May. Singled: 4 June. Hand lifted: 11 Nov.
Series IV: Barley: Ploughed: 23 Nov, 1976. Spring-tine cultivated with crumbler attached: 8 Mar, 1977. Seed sown: 9 Mar. Weedkillers applied: 18 May. Hand harvested: 23 Aug.

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Series I: Potatoes: Ploughed: 9 Nov, 1976. NPK applied: 5 Apr, 1977. Rotary cultivated: 14 Apr. Potatoes planted: 15 Apr. Weedkillers applied: 11 May. Hand lifted: 10 Oct.

NOTE: Samples of wheat and barley grain, potato tubers and sugar beet roots and tops were taken for analysis of N, P, K, Na, Ca and Mg.

WINTER WHEAT

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.03	4.51	3.52	4.95	4.25

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

TABLE	PK SUB
SED	0.367

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.450	10.6

GRAIN MEAN DM% 83.1

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	6.36	6.51	5.94	6.73	6.38

STRAW MEAN DM% 65.9

PLOT AREA HARVESTED 0.00033

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	35.8	42.0	38.2	41.8	39.4

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

TABLE	PK SUB
SED	3.30

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.04	10.3

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77/W/RN/16

SUGAR BEET

SUGAR PERCENTAGE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	16.9	17.0	16.8	16.7	16.8

TOTAL SUGAR TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	6.03	7.13	6.42	7.01	6.65

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

TABLE	PK SUB
SED	0.691

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.847	12.7

TOPS TONNES/HECTARE

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	25.8	32.1	25.4	30.8	28.5

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

TABLE	PK SUB
SED	3.41

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.18	14.6
PLOT AREA HARVESTED	0.00041		

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77/W/RN/16

BARLEY

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	2.90	3.53	3.20	4.34	3.49

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

TABLE	PK SUB
SED	0.338

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.414	11.9

GRAIN MEAN DM% 78.9

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.08	3.69	4.17	4.10	4.01

STRAW MEAN DM% 67.1

PLOT AREA HARVESTED 0.00033

POTATOES

TOTAL TUBERS TONNES/HECTARE

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	37.8	40.7	45.7	43.1	41.8

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

TABLE	PK SUB
SED	2.17

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	2.65	6.3

PLOT AREA HARVESTED 0.00043

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77/R/CS/10 and 77/W/CS/10

LONG TERM LIMING

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

Sponsor: J. Bolton.

The 16th year, spring oats.

For previous years see 'Details' 1967, 1973 and 74-76/R&W/CS/10.

Design: 2 randomised blocks of 16 plots, split into 2.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

Whole plots

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

R	W
0	0
5	5
10	12
20	19

2. P_2O_5 Phosphate, applied cumulatively to previous dressings, as superphosphate (kg P_2O_5):

0
63

3. K_2O Potassium, applied cumulatively to previous dressings, as muriate of potash (kg K_2O):

0
126

Sub plots

4. MG Magnesium, applied cumulatively in 1974, 1976 and 1977 only, as Epsom salts (kg Mg):

0
112

Basal applications:
Sawyers I (R): Manures: N at 80 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).
Stackyard C (W): Manures: N at 95 kg, combine drilled. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 420 l.

Seed: Sawyers I (R) and Stackyard C (W): Manod, sown at 200 kg.

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Cultivations, etc.:-

Sawyers I (R): Deep-tine cultivated twice: 31 Aug, 1976. Ploughed: 11 Dec. Treatment P and K applied: 29 Mar, 1977. Treatment Mg applied: 30 Mar. Power harrowed, seed sown: 4 Apr. Weedkillers applied: 30 May. Combine harvested: 5 Sept.

Stackyard C (W): Power harrowed: 16 Aug, 1976. Ploughed: 23 Nov. Spring-tine cultivated with crumbler attached: 9 Mar, 1977. Treatment P, K and Mg applied: 18 Mar. Spring-tine cultivated with crumbler attached, seed sown: 31 Mar. Weedkillers applied: 30 May. Combine harvested: 3 Sept.

77/R/CS/10 SAWYERS I(R)

GRAIN TONNES/HECTARE

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

P2O5	0	63	MEAN
LIME			
0	2.74	3.78	3.26
5	3.33	3.61	3.47
10	3.23	4.30	3.77
20	3.13	4.04	3.58
MEAN	3.11	3.93	3.52

K2O	0	126	MEAN
LIME			
0	3.50	3.03	3.26
5	3.56	3.38	3.47
10	3.82	3.72	3.77
20	3.68	3.48	3.58
MEAN	3.64	3.40	3.52

K2O	0	126	MEAN
P2O5			
0	3.29	2.92	3.11
63	3.98	3.88	3.93
MEAN	3.64	3.40	3.52

MG	0	112	MEAN
LIME			
0	2.38	4.14	3.26
5	3.01	3.93	3.47
10	3.54	4.00	3.77
20	3.64	3.52	3.58
MEAN	3.14	3.90	3.52

MG	0	112	MEAN
P2O5			
0	2.71	3.51	3.11
63	3.58	4.29	3.93
MEAN	3.14	3.90	3.52

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77/R/CS/10 SAWYERS I(R)

GRAIN TONNES/HECTARE

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

MG	0	112	MEAN
K20			
0	3.30	3.97	3.64
126	2.98	3.82	3.40
MEAN	3.14	3.90	3.52

P205	0		63	
K20	0	126	0	126
LIME				
0	3.19	2.29	3.81	3.76
5	3.38	3.29	3.74	3.47
10	3.26	3.20	4.38	4.23
20	3.34	2.91	4.01	4.06

P205	0		63	
MG	0	112	0	112
LIME				
0	1.90	3.58	2.86	4.71
5	2.91	3.76	3.11	4.10
10	2.94	3.52	4.14	4.47
20	3.09	3.17	4.20	3.87

K20	0		126	
MG	0	112	0	112
LIME				
0	2.75	4.24	2.00	4.05
5	3.11	4.01	2.92	3.85
10	3.56	4.07	3.51	3.92
20	3.78	3.57	3.50	3.47

K20	0		126	
MG	0	112	0	112
P205				
0	2.85	3.73	2.57	3.28
63	3.75	4.22	3.40	4.36

	K20	0		126	
	MG	0	112	0	112
LIME	P205				
0	0	2.35	4.02	1.45	3.14
	63	3.16	4.45	2.55	4.96
5	0	2.97	3.79	2.85	3.73
	63	3.24	4.23	2.98	3.97
10	0	2.80	3.71	3.08	3.32
	63	4.33	4.43	3.94	4.51
20	0	3.29	3.40	2.89	2.93
	63	4.28	3.75	4.11	4.00

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77/R/CS/10 SAWYERS I(R)

GRAIN TONNES/HECTARE

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

TABLE	LIME	P205	K20	MG
SED	0.232	0.164	0.164	0.085

TABLE	LIME P205	LIME K20	P205 K20	LIME MG
SED	0.328	0.328	0.232	0.261
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIME				0.169

TABLE	P205 MG	K20 MG	LIME P205 K20	LIME P205 MG
SED	0.184	0.184	0.463	0.369
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205	0.120			
K20		0.120		
LIME.P205				0.239

TABLE	LIME K20 MG	P205 K20 MG	LIME P205 K20 MG
SED	0.369	0.261	0.521
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
LIME.K20	0.239		
P205.K20		0.169	
LIME.P205.K20			0.339

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.463	13.2
BLOCK.WP.SP	16	0.339	9.6

GRAIN MEAN DM% 83.4

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77/R/CS/10 SAWYERS I(R)

STRAW TONNES/HECTARE

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

P205	0	63	MEAN
LIME			
0	2.85	3.95	3.40
5	2.22	4.18	3.20
10	2.45	4.32	3.38
20	2.08	4.08	3.08
MEAN	2.40	4.13	3.26

K20	0	126	MEAN
LIME			
0	3.71	3.09	3.40
5	2.91	3.50	3.20
10	3.06	3.70	3.38
20	3.05	3.11	3.08
MEAN	3.18	3.35	3.26

K20	0	126	MEAN
P205			
0	2.46	2.34	2.40
63	3.91	4.36	4.13
MEAN	3.18	3.35	3.26

MG	0	112	MEAN
LIME			
0	3.10	3.70	3.40
5	3.21	3.19	3.20
10	3.24	3.52	3.38
20	3.14	3.03	3.08
MEAN	3.17	3.36	3.26

MG	0	112	MEAN
P205			
0	2.31	2.48	2.40
63	4.03	4.23	4.13
MEAN	3.17	3.36	3.26

MG	0	112	MEAN
K20			
0	3.16	3.20	3.18
126	3.18	3.52	3.35
MEAN	3.17	3.36	3.26

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77/R/CS/10 SAWYERS I(R)

STRAW TONNES/HECTARE

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

P205	0		63	
K20	0	126	0	126
LIME				
0	3.33	2.36	4.08	3.81
5	2.20	2.24	3.61	4.76
10	2.30	2.59	3.82	4.81
20	1.99	2.16	4.11	4.06

P205	0		63	
MG	0	112	0	112
LIME				
0	2.56	3.14	3.64	4.25
5	2.20	2.24	4.23	4.14
10	2.31	2.58	4.17	4.46
20	2.18	1.97	4.09	4.08

K20	0		126	
MG	0	112	0	112
LIME				
0	3.73	3.69	2.47	3.71
5	2.89	2.92	3.54	3.45
10	2.86	3.26	3.62	3.79
20	3.17	2.93	3.10	3.12

K20	0		126	
MG	0	112	0	112
P205				
0	2.37	2.55	2.25	2.42
63	3.96	3.86	4.11	4.61

	K20	0		126	
	MG	0	112	0	112
LIME	P205				
0	0	3.16	3.50	1.95	2.78
	63	4.29	3.88	2.99	4.63
5	0	2.17	2.24	2.23	2.24
	63	3.61	3.61	4.85	4.67
10	0	2.11	2.49	2.50	2.68
	63	3.61	4.03	4.73	4.89
20	0	2.03	1.95	2.33	2.00
	63	4.31	3.91	3.87	4.24

STRAW MEAN DM% 71.2

PLOT AREA HARVESTED 0.00247

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77/W/CS/10 STACKYARD (W)

GRAIN TONNES/HECTARE

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

P205	0	63	MEAN
LIME			
0	2.06	2.82	2.44
5	2.17	3.10	2.63
12	2.44	2.91	2.67
19	2.90	2.92	2.91
MEAN	2.39	2.94	2.66

K20	0	126	MEAN
LIME			
0	2.42	2.46	2.44
5	2.56	2.70	2.63
12	2.65	2.69	2.67
19	2.85	2.98	2.91
MEAN	2.62	2.71	2.66

K20	0	126	MEAN
P205			
0	2.22	2.56	2.39
63	3.01	2.86	2.94
MEAN	2.62	2.71	2.66

MG	0	112	MEAN
LIME			
0	1.97	2.91	2.44
5	2.50	2.77	2.63
12	2.59	2.76	2.67
19	2.89	2.93	2.91
MEAN	2.49	2.84	2.66

MG	0	112	MEAN
P205			
0	2.17	2.62	2.39
63	2.80	3.07	2.94
MEAN	2.49	2.84	2.66

MG	0	112	MEAN
K20			
0	2.47	2.76	2.62
126	2.50	2.92	2.71
MEAN	2.49	2.84	2.66

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77/W/CS/10 STACKYARD (W)

STRAW TONNES/HECTARE

P205	0		63	
K20	0	126	0	126
LIME				
0	2.18	1.94	2.66	2.98
5	1.96	2.37	3.16	3.04
12	2.12	2.76	3.18	2.63
19	2.64	3.16	3.05	2.79

P205	0		63	
MG	0	112	0	112
LIME				
0	1.51	2.60	2.43	3.21
5	1.98	2.35	3.01	3.18
12	2.33	2.55	2.84	2.97
19	2.85	2.96	2.93	2.91

K20	0		126	
MG	0	112	0	112
LIME				
0	1.98	2.85	1.96	2.96
5	2.45	2.67	2.54	2.87
12	2.70	2.60	2.47	2.92
19	2.76	2.94	3.02	2.93

K20	0		126	
MG	0	112	0	112
P205				
0	2.04	2.41	2.30	2.82
63	2.91	3.12	2.70	3.02

	K20	0		126	
	MG	0	112	0	112
LIME	P205				
0	0	1.73	2.62	1.29	2.59
	63	2.23	3.09	2.62	3.33
5	0	1.79	2.12	2.16	2.58
	63	3.10	3.22	2.92	3.15
12	0	2.09	2.14	2.57	2.95
	63	3.32	3.05	2.37	2.89
19	0	2.53	2.76	3.16	3.16
	63	2.99	3.12	2.88	2.71

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77/W/CS/10 STACKYARD (W)

GRAIN TONNES/HECTARE

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

TABLE	LIME	P205	K20	MG
SED	0.094	0.067	0.067	0.058

TABLE	LIME P205	LIME K20	P205 K20	LIME MG
SED	0.133	0.133	0.094	0.125
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIME				0.116

TABLE	P205 MG	K20 MG	LIME P205 K20	LIME P205 MG
SED	0.088	0.088	0.189	0.177
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205	0.082			
K20		0.082		
LIME.P205				0.163

TABLE	LIME K20 MG	P205 K20 MG	LIME P205 K20 MG
SED	0.177	0.125	0.250
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
LIME.K20	0.163		
P205.K20		0.116	
LIME.P205.K20			0.231

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.189	7.1
BLOCK.WP.SP	16	0.231	8.7

GRAIN MEAN DM% 79.3

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77/W/CS/10 STACKYARD (W)

STRAW TONNES/HECTARE

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

P205	0	63	MEAN
LIME			
0	1.31	2.16	1.74
5	1.67	2.67	2.17
12	2.02	2.82	2.42
19	2.23	2.83	2.53
MEAN	1.81	2.62	2.21

K20	0	126	MEAN
LIME			
0	1.56	1.91	1.74
5	2.02	2.32	2.17
12	2.21	2.63	2.42
19	2.29	2.77	2.53
MEAN	2.02	2.41	2.21

K20	0	126	MEAN
P205			
0	1.71	1.91	1.81
63	2.33	2.91	2.62
MEAN	2.02	2.41	2.21

MG	0	112	MEAN
LIME			
0	1.41	2.06	1.74
5	2.08	2.26	2.17
12	2.36	2.47	2.42
19	2.58	2.48	2.53
MEAN	2.11	2.32	2.21

MG	0	112	MEAN
P205			
0	1.69	1.93	1.81
63	2.53	2.71	2.62
MEAN	2.11	2.32	2.21

MG	0	112	MEAN
K20			
0	1.93	2.11	2.02
126	2.29	2.52	2.41
MEAN	2.11	2.32	2.21

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77/W/CS/11

SOIL STRUCTURE

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

Sponsor: A.E. Johnston.

The 14th year, ryegrass.

For previous years see 64/C/20(t), 65/C/19(t), 66/C/11(t), 67/C/8(t), 68/C/31(t), 69/W/CS/11(t), 70/W/CS/11(t), 71/W/CS/11, 72/W/CS/11(t) and 73-76/W/CS/11.

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

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

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

0
8
55
110
165

2. NPERCUT Nitrogen fertiliser as ammonium nitrate (kg N per cut), cumulative to previous treatments:

0
30
60
90

Basal applications: Manures: Ground chalk at 2.5 tonnes. P at 85 kg, as triple superphosphate, K at 300 kg, as potassium bicarbonate, Mg at 55 kg, as magnesium sulphate in 1976. None in 1977.

Seed: RvP ryegrass, sown at 50 kg in 1976.

Cultivations, etc.:- N applied: 25 Mar, 1977, 1 June, 26 July. Cut three times: 1 June, 20 July, 29 Sept.

NOTE: Crop samples were taken for N, P, K and Mg analysis.

1ST CUT MEAN DM% 27.3
2ND CUT MEAN DM% 31.3
3RD CUT MEAN DM% 23.6

TOTAL OF 3 CUTS MEAN DM% 27.4

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77/W/CS/10 STACKYARD (W)

STRAW TONNES/HECTARE

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

P205	0		63	
K20	0	126	0	126
LIME				
0	1.37	1.26	1.76	2.56
5	1.65	1.69	2.40	2.95
12	1.81	2.23	2.60	3.03
19	2.01	2.45	2.58	3.09

P205	0		63	
MG	0	112	0	112
LIME				
0	1.00	1.62	1.82	2.49
5	1.53	1.80	2.63	2.71
12	1.87	2.17	2.86	2.78
19	2.35	2.11	2.81	2.86

K20	0		126	
MG	0	112	0	112
LIME				
0	1.37	1.76	1.46	2.35
5	1.95	2.09	2.21	2.42
12	2.20	2.21	2.53	2.74
19	2.19	2.39	2.97	2.57

K20	0		126	
MG	0	112	0	112
P205				
0	1.62	1.80	1.76	2.05
63	2.24	2.43	2.83	2.99

	K20	0		126	
	MG	0	112	0	112
LIME	P205				
0	0	1.16	1.58	0.85	1.66
	63	1.58	1.94	2.07	3.04
5	0	1.59	1.70	1.47	1.90
	63	2.31	2.48	2.95	2.95
12	0	1.72	1.90	2.02	2.45
	63	2.68	2.52	3.04	3.03
19	0	2.00	2.02	2.70	2.20
	63	2.38	2.77	3.24	2.94

STRAW MEAN DM% 88.7

SUB PLOT AREA HARVESTED 0.00247

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77/W/CS/11

1ST CUT (1/6/77) DRY MATTER TONNES/HECTARE

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

NPERCUT / PEAT	0	30	60	90	MEAN
0	0.93	3.39	4.34	5.81	3.62
8	0.99	4.04	6.22	5.35	4.15
55	1.46	3.24	4.88	7.26	4.21
110	3.13	3.29	5.56	5.36	4.33
165	1.14	3.89	4.78	6.92	4.18
MEAN	1.53	3.57	5.16	6.14	4.10

2ND CUT (20/7/77) DRY MATTER TONNES/HECTARE

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

NPERCUT / PEAT	0	30	60	90	MEAN
0	0.45	1.79	2.69	2.97	1.98
8	0.39	2.13	3.17	3.41	2.28
55	0.62	1.91	2.44	4.29	2.31
110	0.74	1.94	2.93	3.49	2.28
165	0.45	1.89	2.73	3.21	2.07
MEAN	0.53	1.93	2.79	3.47	2.18

3RD CUT (29/9/77) DRY MATTER TONNES/HECTARE

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

NPERCUT / PEAT	0	30	60	90	MEAN
0	0.21	0.86	1.73	2.33	1.28
8	0.18	1.06	1.82	2.03	1.27
55	0.26	0.91	1.73	2.75	1.42
110	0.36	0.88	1.74	2.00	1.25
165	0.16	0.84	1.55	2.51	1.27
MEAN	0.23	0.91	1.72	2.32	1.30

TOTAL OF 3 CUTS

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

NPERCUT / PEAT	0	30	60	90	MEAN
0	1.58	6.03	8.76	11.11	6.87
8	1.56	7.24	11.22	10.78	7.70
55	2.34	6.06	9.05	14.30	7.94
110	4.22	6.11	10.24	10.85	7.86
165	1.75	6.62	9.07	12.65	7.52
MEAN	2.29	6.41	9.67	11.94	7.58

PLOT AREA HARVESTED 0.00052

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77/R/CS/13

N LEVELS TO OLD GRASS

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

Sponsor: A.E. Johnston.

The 13th year, old grass.

For previous years see 'Details' 1973 and 74-76/R/CS/13.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 1.83 x 10.1.

Treatments

TOTAL N	Fertiliser nitrogen (kg N-total per annum applied in four equal dressings as 25:0:16):
0(S)	0 (sprayed with ioxynil plus mecoprop to control legumes, duplicated)
0	0 (duplicated)
75	
150	
225	
300	
375	
450	

NOTE: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 280 l applied on 27 Apr, 1977.

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

Cultivations, etc.:- Basal P, K and Mg applied: 2 Dec, 1976. N applied: 14 Mar, 1977, 13 May, 27 June, 15 Aug. Cut: 12 May, 27 June, 15 Aug, 3 Nov.

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77/R/CS/13

1ST CUT (12/5/77) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.12	0.66	1.27	2.32	3.28	3.89	4.04	4.01	2.04

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

TABLE	TOTAL N	
SED	0.234	MIN REP
	0.202	MAX-MIN
	0.165	MAX REP

	TOTAL N
MAX REP	0(S) V 0
MAX-MIN	0(S) OR 0 ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.331	16.2

1ST CUT MEAN DM% 18.5

2ND CUT (27/6/77) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.83	2.00	2.52	3.20	3.55	3.69	3.44	3.49	2.55

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

TABLE	TOTAL N	
SED	0.247	MIN REP
	0.214	MAX-MIN
	0.174	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.349	13.7

2ND CUT MEAN DM% 22.2

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77/R/CS/13

3RD CUT (15/8/77) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.44	0.84	0.88	1.27	1.42	1.74	1.67	1.81	1.14

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

TABLE	TOTAL N	
SED	0.149	MIN REP
	0.129	MAX-MIN
	0.105	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.211	18.6

3RD CUT MEAN DM% 20.0

4TH CUT (3/11/77) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.44	0.96	1.57	2.66	2.72	3.27	3.01	3.03	1.91

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

TABLE	TOTAL N	
SED	0.155	MIN REP
	0.135	MAX-MIN
	0.110	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.220	11.5

4TH CUT MEAN DM% 17.9

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77/R/CS/13

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	1.82	4.46	6.25	9.45	10.98	12.59	12.16	12.34	7.63

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

TABLE	TOTAL N	
SED	0.363	MIN REP
	0.314	MAX-MIN
	0.256	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.513	6.7

TOTAL OF 4 CUTS MEAN DM% 19.6

PLOT AREA HARVESTED 0.00086

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77/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 13th year, old grass.

For previous years see 'Details' 1973 and 74-76/R/CS/14.

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

Whole plot dimensions: 1.83 x 10.1.

Treatments:

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

PLOT	
5/1NORES	Park Grass Plot 5/1: No P or K
5/2PKRES	Park Grass Plot 5/2: Superphosphate to supply 34 kg P, sulphate of potash to supply 224 kg K, annually 1898-1964

On each site, all combinations of:-

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

   33.6
   67.2

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

   0.0
   16.8
   33.6
   67.2

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

   0
   112
   224
   448

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together with extra treatments, all combinations of:

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

   33.6
   67.2

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

   (34)34 — 33.6 kg P in 1965, none 1966-1976, 33.6 kg P 1977
   (34)67 — 33.6 kg P in 1965, none 1966-1976, 67.2 kg P 1977

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

   (56) 56 — 56 kg K in 1965, none 1966-1976, 56 kg K 1977
   (336)336 — 336 kg K in 1965, none 1966-1976, 336 kg K 1977

Basal applications: Weedkiller: 2,4-D ('M.A.C. 2,4-D' at 4.9 l in 340 l).

Cultivations, etc.:- Test P and K applied: 2 Dec, 1976. N applied: 14 Mar, 1977, 27 May, 26 July. Cut: 26 May, 25 July, 2 Nov. Weedkiller applied: 24 June.

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77/R/CS/14 PLOT 5/1 NORES

EXCLUDING EXTRA TREATMENTS

1ST CUT (26/5/77) DRY MATTER TONNES/HECTARE

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

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	0.79	1.87	2.11	1.87	1.66
67.2	1.06	3.02	3.66	3.20	2.73
MEAN	0.92	2.44	2.88	2.54	2.20

K	0	112	224	448	MEAN
NPERCUT					
33.6	1.10	1.88	1.89	1.76	1.66
67.2	1.18	2.98	3.32	3.46	2.73
MEAN	1.14	2.43	2.60	2.61	2.20

K	0	112	224	448	MEAN
P					
0.0	0.72	1.04	0.93	1.01	0.92
16.8	1.49	2.87	2.77	2.63	2.44
33.6	1.29	3.30	3.43	3.52	2.88
67.2	1.08	2.50	3.28	3.28	2.54
MEAN	1.14	2.43	2.60	2.61	2.20

	K	0	112	224	448
NPERCUT	P				
33.6	0.0	0.80	0.73	0.74	0.90
	16.8	1.26	2.10	1.91	2.20
	33.6	1.11	2.87	2.41	2.04
	67.2	1.25	1.80	2.50	1.92
67.2	0.0	0.63	1.35	1.12	1.13
	16.8	1.72	3.64	3.63	3.07
	33.6	1.46	3.72	4.46	5.01
	67.2	0.92	3.20	4.06	4.64

1ST CUT MEAN DM% 22.7

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77/R/CS/14 PLOT 5/1 NORES

EXCLUDING EXTRA TREATMENTS

2ND CUT (25/7/77) DRY MATTER TONNES/HECTARE

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

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	2.39	2.58	2.48	2.55	2.50
67.2	2.62	3.06	3.20	3.44	3.08
MEAN	2.50	2.82	2.84	2.99	2.79

K	0	112	224	448	MEAN
NPERCUT					
33.6	2.03	2.48	2.62	2.85	2.50
67.2	2.40	3.22	3.41	3.30	3.08
MEAN	2.22	2.85	3.01	3.07	2.79

K	0	112	224	448	MEAN
P					
0.0	1.38	2.66	3.07	2.89	2.50
16.8	2.39	2.85	3.12	2.92	2.82
33.6	2.63	2.76	2.95	3.01	2.84
67.2	2.47	3.13	2.90	3.47	2.99
MEAN	2.22	2.85	3.01	3.07	2.79

	K	0	112	224	448
NPERCUT	P				
33.6	0.0	1.39	2.13	2.81	3.21
	16.8	2.31	2.73	2.53	2.74
	33.6	2.36	2.47	2.39	2.68
	67.2	2.07	2.61	2.75	2.76
67.2	0.0	1.37	3.19	3.33	2.57
	16.8	2.47	2.97	3.72	3.10
	33.6	2.89	3.04	3.52	3.35
	67.2	2.86	3.66	3.06	4.18

2ND CUT MEAN DM% 24.6

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77/R/CS/14 PLOT 5/1 NORES

EXCLUDING EXTRA TREATMENTS

3RD CUT (2/11/77) DRY MATTER TONNES/HECTARE

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

P / NPERCUT	0.0	16.8	33.6	67.2	MEAN
33.6	1.99	2.07	1.61	1.96	1.91
67.2	2.00	2.57	2.04	2.44	2.26
MEAN	1.99	2.32	1.82	2.20	2.08

K / NPERCUT	0	112	224	448	MEAN
33.6	1.57	1.64	2.31	2.12	1.91
67.2	1.60	2.51	2.66	2.27	2.26
MEAN	1.58	2.08	2.48	2.19	2.08

K / P	0	112	224	448	MEAN
0.0	1.42	1.88	2.52	2.15	1.99
16.8	1.72	2.17	2.65	2.75	2.32
33.6	1.24	2.21	2.00	1.85	1.82
67.2	1.96	2.04	2.77	2.03	2.20
MEAN	1.58	2.08	2.48	2.19	2.08

NPERCUT	K / P	0	112	224	448
33.6	0.0	1.20	1.60	2.99	2.16
	16.8	2.02	2.01	2.09	2.17
	33.6	1.24	1.56	1.92	1.72
	67.2	1.80	1.39	2.23	2.41
67.2	0.0	1.63	2.17	2.05	2.13
	16.8	1.42	2.32	3.21	3.34
	33.6	1.24	2.86	2.08	1.97
	67.2	2.11	2.70	3.30	1.64

3RD CUT MEAN DM% 21.8

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77/R/CS/14 PLOT 5/1 NORES

EXCLUDING EXTRA TREATMENTS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

P / NPERCUT	0.0	16.8	33.6	67.2	MEAN
33.6	5.16	6.52	6.19	6.37	6.06
67.2	5.67	8.65	8.90	9.08	8.08
MEAN	5.42	7.58	7.55	7.73	7.07

K / NPERCUT	0	112	224	448	MEAN
33.6	4.70	6.00	6.82	6.73	6.06
67.2	5.18	8.71	9.38	9.03	8.08
MEAN	4.94	7.35	8.10	7.88	7.07

K / P	0	112	224	448	MEAN
0.0	3.52	5.58	6.52	6.05	5.42
16.8	5.60	7.89	8.54	8.31	7.58
33.6	5.15	8.27	8.39	8.38	7.55
67.2	5.51	7.68	8.95	8.78	7.73
MEAN	4.94	7.35	8.10	7.88	7.07

NPERCUT	K / P	0	112	224	448
33.6	0.0	3.39	4.45	6.54	6.27
	16.8	5.58	6.85	6.52	7.11
	33.6	4.71	6.91	6.72	6.44
	67.2	5.12	5.79	7.48	7.09
67.2	0.0	3.64	6.71	6.50	5.83
	16.8	5.61	8.94	10.56	9.51
	33.6	5.60	9.62	10.05	10.33
	67.2	5.89	9.56	10.42	10.46

TOTAL OF 3 CUTS MEAN DM% 23.0

PLOT AREA HARVESTED 0.00086

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77/R/CS/14 PLOT 5/1 NORES

EXTRA TREATMENTS

1ST CUT (26/5/77) DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	2.24	1.78	2.01
67.2	2.38	2.84	2.61
MEAN	2.31	2.31	2.31

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	2.10	1.93	2.01
67.2	2.25	2.97	2.61
MEAN	2.17	2.45	2.31

K	(56)56	(336)336	MEAN
P			
(34)34	2.09	2.54	2.31
(34)67	2.26	2.36	2.31
MEAN	2.17	2.45	2.31

1ST CUT MEAN DM% 24.4

2ND CUT (25/7/77) DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	3.27	2.49	2.88
67.2	3.44	3.30	3.37
MEAN	3.35	2.90	3.13

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	2.46	3.29	2.88
67.2	3.46	3.28	3.37
MEAN	2.96	3.29	3.13

K	(56)56	(336)336	MEAN
P			
(34)34	3.04	3.67	3.35
(34)67	2.89	2.91	2.90
MEAN	2.96	3.29	3.13

2ND CUT MEAN DM% 25.2

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77/R/CS/14 PLOT 5/1 NORES

EXTRA TREATMENTS

3RD CUT (2/11/77) DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	2.32	2.33	2.32
67.2	3.07	3.44	3.25
MEAN	2.69	2.89	2.79

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	2.00	2.65	2.32
67.2	3.04	3.46	3.25
MEAN	2.52	3.06	2.79

K	(56)56	(336)336	MEAN
P			
(34)34	2.36	3.02	2.69
(34)67	2.68	3.09	2.89
MEAN	2.52	3.06	2.79

3RD CUT MEAN DM% 23.0

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	7.82	6.60	7.21
67.2	8.89	9.59	9.24
MEAN	8.36	8.09	8.23

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	6.56	7.87	7.21
67.2	8.76	9.71	9.24
MEAN	7.66	8.79	8.23

K	(56)56	(336)336	MEAN
P			
(34)34	7.49	9.22	8.36
(34)67	7.83	8.36	8.09
MEAN	7.66	8.79	8.23

TOTAL OF 3 CUTS MEAN DM% 24.2

PLOT AREA HARVESTED 0.00086

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77/R/CS/14 PLOT 5/2 PKRES

EXCLUDING EXTRA TREATMENTS

1ST CUT (26/5/77) DRY MATTER TONNES/HECTARE

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

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	2.64	2.55	2.40	1.98	2.39
67.2	4.68	4.74	4.66	4.18	4.57
MEAN	3.66	3.65	3.53	3.08	3.48

K	0	112	224	448	MEAN
NPERCUT					
33.6	2.37	2.55	2.29	2.37	2.39
67.2	4.54	4.73	4.64	4.34	4.57
MEAN	3.46	3.64	3.47	3.35	3.48

K	0	112	224	448	MEAN
P					
0.0	3.36	3.98	3.82	3.48	3.66
16.8	3.48	3.80	3.52	3.78	3.65
33.6	3.81	3.84	3.51	2.96	3.53
67.2	3.17	2.94	3.01	3.21	3.08
MEAN	3.46	3.64	3.47	3.35	3.48

	K	0	112	224	448
NPERCUT	P				
33.6	0.0	2.35	2.98	2.66	2.58
	16.8	2.37	2.54	2.63	2.67
	33.6	2.48	2.78	2.08	2.24
	67.2	2.27	1.88	1.81	1.99
67.2	0.0	4.37	4.98	4.99	4.38
	16.8	4.59	5.06	4.42	4.88
	33.6	5.13	4.91	4.95	3.67
	67.2	4.08	3.99	4.22	4.43

1ST CUT MEAN DM% 20.3

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77/R/CS/14 PLOT 5/2 PKRES

EXCLUDING EXTRA TREATMENTS

2ND CUT (25/7/77) DRY MATTER TONNES/HECTARE

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

P / NPERCUT	0.0	16.8	33.6	67.2	MEAN
33.6	2.92	2.66	2.80	2.77	2.79
67.2	3.59	3.74	3.71	3.81	3.71
MEAN	3.26	3.20	3.26	3.29	3.25

K / NPERCUT	0	112	224	448	MEAN
33.6	2.75	2.85	2.88	2.67	2.79
67.2	3.83	3.43	3.72	3.87	3.71
MEAN	3.29	3.14	3.30	3.27	3.25

K / P	0	112	224	448	MEAN
0.0	3.28	2.90	3.44	3.40	3.26
16.8	3.34	2.98	3.21	3.29	3.20
33.6	3.18	3.47	3.27	3.11	3.26
67.2	3.36	3.23	3.28	3.29	3.29
MEAN	3.29	3.14	3.30	3.27	3.25

NPERCUT	K / P	0	112	224	448
33.6	0.0	2.73	2.95	3.02	2.98
	16.8	2.80	2.63	2.75	2.48
	33.6	2.50	3.07	2.92	2.71
	67.2	2.98	2.76	2.84	2.50
67.2	0.0	3.83	2.86	3.85	3.82
	16.8	3.88	3.32	3.67	4.10
	33.6	3.86	3.66	3.62	3.50
	67.2	3.75	3.70	3.72	4.07

2ND CUT MEAN DM% 26.9

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77/R/CS/14 PLOT 5/2 PKRES

EXCLUDING EXTRA TREATMENTS

3RD CUT (2/11/77) DRY MATTER TONNES/HECTARE

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

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	2.02	1.72	1.96	1.94	1.91
67.2	2.58	2.79	2.52	2.77	2.66
MEAN	2.30	2.26	2.24	2.36	2.29

K	0	112	224	448	MEAN
NPERCUT					
33.6	1.98	2.05	1.83	1.78	1.91
67.2	2.91	2.55	2.55	2.64	2.66
MEAN	2.45	2.30	2.19	2.21	2.29

K	0	112	224	448	MEAN
P					
0.0	2.32	2.63	2.15	2.10	2.30
16.8	2.55	2.19	2.29	1.99	2.26
33.6	2.27	2.31	2.04	2.34	2.24
67.2	2.65	2.08	2.28	2.41	2.36
MEAN	2.45	2.30	2.19	2.21	2.29

	K	0	112	224	448
NPERCUT	P				
33.6	0.0	1.98	2.45	1.73	1.92
	16.8	1.68	1.69	1.74	1.78
	33.6	1.97	2.18	1.87	1.82
	67.2	2.30	1.89	1.97	1.61
67.2	0.0	2.66	2.81	2.56	2.27
	16.8	3.42	2.69	2.83	2.21
	33.6	2.56	2.44	2.20	2.87
	67.2	3.01	2.27	2.59	3.20

3RD CUT MEAN DM% 21.2

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77/R/CS/14 PLOT 5/2 PKRES

EXCLUDING EXTRA TREATMENTS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

P	0.0	16.8	33.6	67.2	MEAN
NPERCUT					
33.6	7.58	6.94	7.15	6.70	7.09
67.2	10.85	11.27	10.89	10.76	10.94
MEAN	9.22	9.10	9.02	8.73	9.02

K	0	112	224	448	MEAN
NPERCUT					
33.6	7.10	7.45	7.00	6.82	7.09
67.2	11.29	10.72	10.91	10.85	10.94
MEAN	9.20	9.09	8.95	8.83	9.02

K	0	112	224	448	MEAN
P					
0.0	8.97	9.52	9.40	8.98	9.22
16.8	9.38	8.96	9.02	9.06	9.10
33.6	9.25	9.62	8.82	8.40	9.02
67.2	9.19	8.25	8.58	8.90	8.73
MEAN	9.20	9.09	8.95	8.83	9.02

	K	0	112	224	448
NPERCUT	P				
33.6	0.0	7.06	8.39	7.41	7.48
	16.8	6.85	6.86	7.12	6.93
	33.6	6.95	8.03	6.86	6.77
	67.2	7.54	6.53	6.62	6.10
67.2	0.0	10.87	10.65	11.40	10.47
	16.8	11.90	11.07	10.92	11.19
	33.6	11.55	11.21	10.77	10.04
	67.2	10.83	9.96	10.53	11.71

TOTAL OF 3 CUTS MEAN DM% 22.8

PLOT AREA HARVESTED 0.00086

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77/R/CS/14 PLOT 5/2 PKRES

EXTRA TREATMENTS

1ST CUT (26/5/77) DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	2.96	2.65	2.80
67.2	4.77	5.25	5.01
MEAN	3.86	3.95	3.91

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	2.74	2.87	2.80
67.2	5.02	5.00	5.01
MEAN	3.88	3.93	3.91

K	(56)56	(336)336	MEAN
P			
(34)34	3.94	3.79	3.86
(34)67	3.82	4.08	3.95
MEAN	3.88	3.93	3.91

1ST CUT MEAN DM% 20.1

2ND CUT (25/7/77) DRY MATTER TONNES/HECTARE

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

P	(34)34	(34)67	MEAN
NPERCUT			
33.6	3.09	2.72	2.90
67.2	4.04	3.62	3.83
MEAN	3.56	3.17	3.37

K	(56)56	(336)336	MEAN
NPERCUT			
33.6	2.67	3.13	2.90
67.2	3.54	4.12	3.83
MEAN	3.11	3.63	3.37

K	(56)56	(336)336	MEAN
P			
(34)34	3.38	3.74	3.56
(34)67	2.83	3.51	3.17
MEAN	3.11	3.63	3.37

2ND CUT MEAN DM% 27.0

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77/R/CS/14 PLOT 5/2 PKRES

EXTRA TREATMENTS

3RD CUT (2/11/77) DRY MATTER TONNES/HECTARE

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

P / NPERCUT	(34)34	(34)67	MEAN
33.6	1.90	2.03	1.96
67.2	2.61	2.75	2.68
MEAN	2.25	2.39	2.32

K / NPERCUT	(56)56	(336)336	MEAN
33.6	1.87	2.06	1.96
67.2	2.79	2.57	2.68
MEAN	2.33	2.31	2.32

K / P	(56)56	(336)336	MEAN
(34)34	2.40	2.11	2.25
(34)67	2.26	2.52	2.39
MEAN	2.33	2.31	2.32

3RD CUT MEAN DM% 21.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

P / NPERCUT	(34)34	(34)67	MEAN
33.6	7.95	7.39	7.67
67.2	11.41	11.62	11.52
MEAN	9.68	9.51	9.59

K / NPERCUT	(56)56	(336)336	MEAN
33.6	7.28	8.06	7.67
67.2	11.35	11.69	11.52
MEAN	9.32	9.87	9.59

K / P	(56)56	(336)336	MEAN
(34)34	9.72	9.64	9.68
(34)67	8.91	10.11	9.51
MEAN	9.32	9.87	9.59

TOTAL OF 3 CUTS MEAN DM% 22.8

PLOT AREA HARVESTED 0.00086

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77/W/CS/16

IRRIGATION AND EELWORMS

Object: To study the cumulative effects of dazomet (later, aldicarb) and irrigation on the yield and incidence of Globodera spp. on potatoes grown continuously. The effects of growing susceptible and resistant varieties are also studied, either grown continuously or alternated. The effects of enhanced farm practice have been tested since 1976 - Woburn Butt Close.

Sponsors: D.M. Parrott, F.G.W. Jones.

The 12th year, potatoes.

For previous years see 66/C/32(t), 67/C/25, 68/C/19, 69/W/CS/16(t), 70-71/W/CS/16, 72/W/CS/16(t) and 73-76/W/CS/16.

Design: 3 blocks of 4 plots, sequences of varieties on strips of 2 half plots, aldicarb on quarter plots, farm practice on pairs of eighth plots.

Whole plot dimensions: 14.5 x 15.2.

Treatments: All combinations of:-

Whole plots

1. IRRIGTN — Irrigation by trickle lines:

NONE	None
FULL	Full (138 mm)

Strips of half plots

2. CROPSEQN — Cropping sequences with potatoes resistant (R) and susceptible (S) to potato cyst nematode:

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
R/R/R/R	R	R	R	R	R	R	R	R	R	R	R	R
R/S/R/S	R	S	R	S	R	S	R	S	R	S	R	S
S/S/S/S	S	S	S	S	S	S	S	S	S	S	S	S
S/R/S/R	S	R	S	R	S	R	S	R	S	R	S	R

Quarter plots

3. ALDICARB — Aldicarb (kg) applied cumulatively to previous dazomet treatments:

0.0
5.6

Pairs of eighth plots

4. FARMING — Farm practice:

STANDARD	Standard.	Normal-size seed (3 cm) planted 50 cm apart in ridges 71 cm apart. Haulm destroyed mid-September
ENHANCED	Enhanced.	Ware-size seed (6 cm) planted 25 cm apart in ridges 71 cm apart. Additional N at 125 kg, as 'Nitro-Chalk' at tuber initiation. Haulm not destroyed.

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NOTE: Mixed seed was accidentally planted on plots intended for the resistant (R) variety, Maris Piper. These plots only were lifted two weeks after planting, appropriate plots retreated with aldicarb and new seed of Maris Piper planted.

Irrigation treatments 1977 (mm water):

8 July	12.5
11 July	12.5
15 July	12.5
19 July	12.5
20 July	12.5
21 July	12.5
25 July	12.5
27 July	12.5
29 July	12.5
1 Aug	12.5
5 Aug	12.5
Total	137.5

Basal applications: Manures: (13:13:20) at 1860 kg. Weedkiller: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 340 l and twice in 430 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions, with fungicide.

Seed: Resistant, Maris Piper. Susceptible, Pentland Crown.

Cultivations, etc.:- Heavy-tine cultivated: 22 Nov, 1976. Ploughed: 17 Feb, 1977. NPK applied: 5 Apr. Spring-tine cultivated with crumbler attached: 18 Apr. Aldicarb applied, and these plots only rotary cultivated, potatoes planted: 21 Apr. Grubbed: 2 May. Maris Piper plots lifted: 6 May. Maris Piper plots only rotary cultivated, aldicarb treatments re-applied, and these plots only rotary cultivated: 9 May. Maris Piper replanted, fine tooth harrowed: 10 May. Fine tooth harrowed and grubbed Pentland Crown plots: 25 May. Earthed up Pentland Crown plots only, weedkiller applied to all plots: 26 May. Fungicide applied, grubbed Maris Piper plots only: 28 June. Ridged up Maris Piper plots only: 1 July. N treatment applied: 4 July. Fungicide with insecticide applied: 13 July, 11 Aug, 1 Sept. Haulm mechanically destroyed on standard practice plots only: 19 Sept. Lifted: 28 Oct.

NOTE: Soil samples were taken in spring before treatments were applied for cyst and egg counts of Globodera rostochiensis and G. pallida.

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TOTAL TUBERS TONNES/HECTARE

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

CROPSEQN IRRIGTN	R/R/R/R	R/S/R/S	S/S/S/S	S/R/S/R	MEAN
NONE	12.7	20.3	22.0	13.0	17.0
FULL	17.2	24.1	27.8	12.8	20.5
MEAN	14.9	22.2	24.9	12.9	18.7

ALDICARB IRRIGTN	0.0	5.6	MEAN
NONE	12.2	21.8	17.0
FULL	13.6	27.3	20.5
MEAN	12.9	24.6	18.7

ALDICARB CROPSEQN	0.0	5.6	MEAN
R/R/R/R	13.2	16.6	14.9
R/S/R/S	16.6	27.8	22.2
S/S/S/S	12.5	37.2	24.9
S/R/S/R	9.3	16.5	12.9
MEAN	12.9	24.6	18.7

FARMING IRRIGTN	STANDARD	ENHANCED	MEAN
NONE	13.1	20.9	17.0
FULL	14.5	26.4	20.5
MEAN	13.8	23.7	18.7

FARMING CROPSEQN	STANDARD	ENHANCED	MEAN
R/R/R/R	10.4	19.4	14.9
R/S/R/S	16.9	27.4	22.2
S/S/S/S	19.3	30.4	24.9
S/R/S/R	8.5	17.3	12.9
MEAN	13.8	23.7	18.7

FARMING ALDICARB	STANDARD	ENHANCED	MEAN
0.0	8.8	17.0	12.9
5.6	18.8	30.3	24.6
MEAN	13.8	23.7	18.7

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77/W/CS/16

TOTAL TUBERS TONNES/HECTARE

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

	ALDICARB	0.0	5.6
IRRIGTN	CROPSEQN		
NONE	R/R/R/R	12.4	13.1
	R/S/R/S	13.7	26.8
	S/S/S/S	11.3	32.6
	S/R/S/R	11.2	14.8
FULL	R/R/R/R	14.1	20.2
	R/S/R/S	19.4	28.8
	S/S/S/S	13.7	41.8
	S/R/S/R	7.3	18.2

	FARMING	STANDARD	ENHANCED
IRRIGTN	CROPSEQN		
NONE	R/R/R/R	9.2	16.2
	R/S/R/S	16.2	24.4
	S/S/S/S	16.8	27.1
	S/R/S/R	10.1	16.0
FULL	R/R/R/R	11.7	22.6
	R/S/R/S	17.7	30.5
	S/S/S/S	21.9	33.7
	S/R/S/R	6.9	18.7

ALDICARB	0.0		5.6	
FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
IRRIGTN				
NONE	8.7	15.6	17.5	26.2
FULL	8.8	18.5	20.2	34.3

ALDICARB	0.0		5.6	
FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
CROPSEQN				
R/R/R/R	8.4	18.0	12.5	20.8
R/S/R/S	11.6	21.5	22.3	33.4
S/S/S/S	9.1	15.9	29.5	44.9
S/R/S/R	5.9	12.7	11.1	22.0

	ALDICARB	0.0		5.6	
	FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
IRRIGTN	CROPSEQN				
NONE	R/R/R/R	8.5	16.2	10.0	16.2
	R/S/R/S	9.2	18.2	23.1	30.5
	S/S/S/S	8.6	14.0	25.0	40.2
	S/R/S/R	8.5	13.9	11.7	18.0
FULL	R/R/R/R	8.4	19.8	14.9	25.5
	R/S/R/S	14.0	24.8	21.4	36.2
	S/S/S/S	9.7	17.8	34.1	49.6
	S/R/S/R	3.2	11.5	10.5	26.0

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TOTAL TUBERS TONNES/HECTARE

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

TABLE	IRRIGTN	CROPSEQN	ALDICARB	FARMING
SED	1.65	2.34	1.59	1.03

TABLE	IRRIGTN CROPSEQN	IRRIGTN ALDICARB	CROPSEQN ALDICARB	IRRIGTN FARMING
SED	3.30	2.29	3.24	1.95
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN		2.24		1.45
CROPSEQN			3.17	

TABLE	CROPSEQN FARMING	ALDICARB FARMING	IRRIGTN CROPSEQN ALDICARB	IRRIGTN CROPSEQN FARMING
SED	2.75	1.89	4.58	3.89
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROPSEQN	2.05			
ALDICARB		1.25		
FARMING		1.74		
IRRIGTN.CROPSEQN			4.49	2.90

TABLE	IRRIGTN ALDICARB FARMING	CROPSEQN ALDICARB FARMING	IRRIGTN CROPSEQN ALDICARB FARMING
SED	2.61	3.69	5.22
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
IRRIGTN	2.67		
CROPSEQN		3.78	
IRRIGTN.CROPSEQN			5.34
IRRIGTN.ALDICARB	1.77		
CROPSEQN.ALDICARB		2.51	
IRRIGTN.FARMING	2.46		
CROPSEQN.FARMING		3.48	
IRRIGTN.CROPSEQN.ALDICARB			3.55
IRRIGTN.CROPSEQN.FARMING			4.93

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

STRATUM	DF	SE	CV%
BLOCK.ROW.HP	14	4.05	21.6
BLOCK.ROW.HP.QP	16	5.49	29.3
BLOCK.ROW.HP.EP	16	3.56	19.0
BLOCK.ROW.HP.QP.EP	16	3.53	18.9

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77/W/CS/16

PERCENTAGE WARE 3.81 CM(1.5 INCH) RIDDLE

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

CROPSEQN IRRIGTN	R/R/R/R	R/S/R/S	S/S/S/S	S/R/S/R	MEAN
NONE	74.3	82.3	82.7	80.9	80.0
FULL	87.1	89.2	88.5	77.1	85.5
MEAN	80.7	85.7	85.6	79.0	82.8

ALDICARB IRRIGTN	0.0	5.6	MEAN
NONE	76.1	84.0	80.0
FULL	80.7	90.3	85.5
MEAN	78.4	87.1	82.8

ALDICARB CROPSEQN	0.0	5.6	MEAN
R/R/R/R	78.0	83.4	80.7
R/S/R/S	82.3	89.2	85.7
S/S/S/S	80.8	90.3	85.6
S/R/S/R	72.5	85.5	79.0
MEAN	78.4	87.1	82.8

FARMING IRRIGTN	STANDARD	ENHANCED	MEAN
NONE	84.7	75.4	80.0
FULL	85.5	85.5	85.5
MEAN	85.1	80.4	82.8

FARMING CROPSEQN	STANDARD	ENHANCED	MEAN
R/R/R/R	83.3	78.2	80.7
R/S/R/S	89.6	81.9	85.7
S/S/S/S	88.3	82.8	85.6
S/R/S/R	79.2	78.9	79.0
MEAN	85.1	80.4	82.8

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77/W/CS/16

PERCENTAGE WARE 3.81 CM(1.5 INCH) RIDDLE

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

FARMING	STANDARD	ENHANCED	MEAN
ALDICARB			
0.0	80.9	75.9	78.4
5.6	89.3	84.9	87.1
MEAN	85.1	80.4	82.8

	ALDICARB	0.0	5.6
IRRIGTN	CROPSEQN		
NONE	R/R/R/R	71.5	77.1
	R/S/R/S	76.7	87.8
	S/S/S/S	77.7	87.6
	S/R/S/R	78.6	83.3
FULL	R/R/R/R	84.4	89.7
	R/S/R/S	87.8	90.6
	S/S/S/S	83.9	93.1
	S/R/S/R	66.5	87.7

	FARMING	STANDARD	ENHANCED
IRRIGTN	CROPSEQN		
NONE	R/R/R/R	78.7	69.9
	R/S/R/S	88.2	76.4
	S/S/S/S	85.8	79.5
	S/R/S/R	86.2	75.7
FULL	R/R/R/R	87.8	86.4
	R/S/R/S	91.1	87.3
	S/S/S/S	90.8	86.1
	S/R/S/R	72.2	82.1

ALDICARB	0.0		5.6	
FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
IRRIGTN				
NONE	83.0	69.3	86.5	81.4
FULL	78.8	82.5	92.1	88.4

ALDICARB	0.0		5.6	
FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
CROPSEQN				
R/R/R/R	81.2	74.8	85.3	81.5
R/S/R/S	87.0	77.5	92.2	86.2
S/S/S/S	84.6	77.0	92.1	88.6
S/R/S/R	70.8	74.3	87.5	83.4

	ALDICARB	0.0		5.6	
	FARMING	STANDARD	ENHANCED	STANDARD	ENHANCED
IRRIGTN	CROPSEQN				
NONE	R/R/R/R	79.2	63.9	78.3	76.0
	R/S/R/S	84.3	69.1	92.0	83.7
	S/S/S/S	82.9	72.6	88.8	86.4
	S/R/S/R	85.5	71.6	86.8	79.7
FULL	R/R/R/R	83.3	85.6	92.3	87.1
	R/S/R/S	89.7	85.9	92.5	88.7
	S/S/S/S	86.2	81.5	95.4	90.8
	S/R/S/R	56.1	77.0	88.3	87.1

EIGHTH PLOT AREA HARVESTED 0.00092

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77/R/CS/24

PK AND TAKE-ALL

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

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

The tenth year, continuous winter wheat (after continuous barley 1968-1973).

For previous years see 'Details' 1973 and 74-76/R/CS/24.

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

Whole plot dimensions: 5.33 x 20.1.

Treatments: All combinations of:-

Whole plots

1. P Phosphate (kg P) as superphosphate:

0	None
15 A	15 annually
60 A	60 annually
90 S	90 six-yearly, last applied autumn 1973
360 S	360 six-yearly, last applied autumn 1973

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

30
120

Sub plots

3. N RESID Residues of nitrogen fertiliser, applied annually 1970-1973 (kg N):

38
75
113
150

Basal applications: Manures: 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.:- Ploughed: 13 Sept, 1976. Heavy spring-tine cultivated: 3 Nov. P and K applied: 4 Nov. Seed sown: 5 Nov. N applied: 15 Apr, 1977. Weedkillers applied: 9 May. Combine harvested: 8 Sept.

NOTE: The crop was sampled in July to assess take-all.

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77/R/CS/24

GRAIN TONNES/HECTARE

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

P / K	0	15 A	60 A	90 S	360 S	MEAN
30	4.62	4.44	4.90	4.58	4.77	4.66
120	4.46	5.24	5.24	5.17	5.12	5.05
MEAN	4.54	4.84	5.07	4.88	4.95	4.85

N RESID / K	38	75	113	150	MEAN
30	4.62	4.62	4.73	4.67	4.66
120	5.12	4.88	5.24	4.95	5.05
MEAN	4.87	4.75	4.99	4.81	4.85

N RESID / P	38	75	113	150	MEAN
0	4.85	4.09	4.87	4.33	4.54
15 A	4.74	4.92	4.96	4.75	4.84
60 A	4.85	5.03	5.06	5.34	5.07
90 S	4.99	4.78	4.91	4.83	4.88
360 S	4.92	4.93	5.13	4.91	4.95
MEAN	4.87	4.75	4.99	4.81	4.85

K	N RESID / P	38	75	113	150
30	0	4.76	4.42	4.71	4.58
	15 A	4.33	4.64	4.40	4.39
	60 A	4.77	4.60	4.91	5.33
	90 S	4.42	4.76	4.46	4.67
	360 S	4.84	4.67	5.17	4.41
120	0	4.94	3.76	5.03	4.09
	15 A	5.14	5.19	5.53	5.11
	60 A	4.94	5.46	5.22	5.36
	90 S	5.55	4.79	5.35	5.00
	360 S	5.00	5.19	5.08	5.21

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

TABLE	P	K	N RESID	P K
SED	0.137	0.087	0.123	0.194

TABLE	P N RESID	K N RESID	P K N RESID
SED	0.274	0.174	0.407

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

STRATUM	DF	SE	CV%
BLOCK.WP+BLOCK.WP.SP	37	0.387	8.0

GRAIN MEAN DM% 80.5

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STRAW TONNES/HECTARE

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

P / K	0	15 A	60 A	90 S	360 S	MEAN
30	3.76	3.66	4.34	3.95	4.28	4.00
120	3.92	4.87	5.07	4.86	5.16	4.77
MEAN	3.84	4.27	4.70	4.40	4.72	4.39

N RESID / K	38	75	113	150	MEAN
30	3.88	3.82	4.10	4.19	4.00
120	4.84	4.73	4.69	4.83	4.77
MEAN	4.36	4.28	4.39	4.51	4.39

N RESID / P	38	75	113	150	MEAN
0	4.31	3.43	4.05	3.56	3.84
15 A	4.21	4.42	4.07	4.36	4.27
60 A	4.53	4.56	4.60	5.11	4.70
90 S	4.38	4.16	4.46	4.61	4.40
360 S	4.38	4.81	4.77	4.91	4.72
MEAN	4.36	4.28	4.39	4.51	4.39

K	N RESID / P	38	75	113	150
30	0	3.98	3.33	4.02	3.72
	15 A	3.57	3.79	3.37	3.90
	60 A	4.18	3.84	4.56	4.76
	90 S	3.68	3.73	4.09	4.29
	360 S	4.00	4.42	4.45	4.27
120	0	4.65	3.53	4.09	3.41
	15 A	4.85	5.05	4.78	4.82
	60 A	4.88	5.28	4.65	5.46
	90 S	5.08	4.60	4.83	4.92
	360 S	4.77	5.20	5.09	5.56

STRAW MEAN DM% 90.6

SUB PLOT AREA HARVESTED 0.00270

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77/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of Globodera rostochiensis and yield of potatoes. Residual effects of previous treatments are studied in wheat and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The eighth year, potatoes, wheat, barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-76/W/CS/34.

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14.

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

	1969	1970	1971	1972	1973	1974	1975	1976	1977
Series I	P	P	P*	SB	B	P	P*	W	B
Series II	P	P	P	P*	SB	B	P	P*	W
Series III	P	B	P	P	P*	SB	B	P	P*
Series IV	P	B	P	P	P	P*	SB	B	P

P = potatoes, SB = sugar beet, B = barley, W = wheat

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

Treatments to barley (Series I): All combinations of:-

1. NEMACIDE(75) Residues of nematicides applied 1975:

DURSBAN	'Dursban'
PHOXIM	Phoxim
DACAMOX	'Dacamox'

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

SINGLE	Single (2.8 kg for 'Dursban' and 'Dacamox': 5.6 kg for phoxim)
DOUBLE	Double (5.6 kg for 'Dursban' and 'Dacamox': 11.2 kg for phoxim)
QUAD	Quadruple (11.2 kg for 'Dursban' and 'Dacamox': 22.4 kg for phoxim)
NONE	plus one untreated plot per block

Treatments to wheat (Series II): All combinations of:-

1. NEMACIDE(76) Residues of nematicides applied 1976:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

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

		'AC 64475'	Carbofuran	Phoxim
SINGLE	Single	2.2	2.8	5.6
DOUBLE	Double	4.4	5.6	11.2
QUAD	Quadruple	8.8	11.2	22.4

NONE plus one untreated plot per block

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

1. NEMACIDE(77) Nematicides applied 1977:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

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

		'AC 64475'	Carbofuran	Phoxim
SINGLE	Single	2.2	2.8	5.6
DOUBLE	Double	4.4	5.6	11.2
QUAD	Quadruple	8.8	11.2	22.4

NONE plus one untreated plot per block

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

1. NEMACIDE(74) Residues of nematicides applied 1974:

BENOMYL	Benomyl
CARBOFUR	Carbofuran
THIABEND	Thiabendazole

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

5.6	5.6
11.2	11.2
22.4	22.4

0.0 plus one untreated plot per block

Standard applications:
Potatoes (Series III & IV): Manures (13:13:20) at 1860 kg. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.
Wheat (Series II): Manures: Magnesian limestone at 5 tonnes (10:24:24) at 250 kg combine drilled, N at 90 kg as 'Nitro-Chalk'. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.
Barley Series I: Manures: (20:14:14) at 450 kg combine drilled. Weedkillers: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.

Seed: Potatoes: Pentland Crown
Wheat: Cappelle, sown at 210 kg
Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Potatoes, test crop (Series III): Heavy-tine cultivated: 8 Nov, 1976. NPK applied: 5 Apr, 1977. Treatments applied, all plots rotary cultivated, potatoes planted: 14 Apr. Grubbed: 3 May. Fine-tooth harrowed and grubbed: 25 May. Earthed up: 26 May. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 14 Oct.

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Potatoes (Series IV): Subsoiled, tines 140 cm apart and 50 cm deep: 7 Sept, 1976. Ploughed: 9 Nov. NPK applied: 5 Apr, 1977. Rotary cultivated, potatoes planted: 14 Apr. Grubbed: 3 May. Fine-tooth harrowed and grubbed: 25 May. Earthed up: 26 May. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 14 Oct.
Wheat (Series II): Magnesian limestone applied: 1 Nov, 1976. Heavy-tine cultivated: 8 Nov. Seed sown: 9 Nov. N applied: 25 Apr, 1977. Weedkillers applied: 11 May. Insecticide applied: 11 July. Combine harvested: 7 Sept.
Barley (Series I): Ploughed: 9 Nov, 1976. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar, 1977. Weedkillers applied: 11 May. Combine harvested: 15 Aug.

NOTES: (1) Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of Globodera rostochiensis.
(2) For Barley (Series I) the analysis has been adjusted by covariance for a linear trend.
(3) For Potatoes (Series IV) the analysis presented assumes a Fourier curve with 2 terms, a sine and a cosine to represent positional variation.

ERRATA TO 'YIELDS' 1976 76/W/CS/34

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

page 157. TOTAL TUBERS TONNES/HECTARE

NEMACIDE(73) OXAMYL, RATE DOUBLE should read 23.0 not 3.0

page 157. PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

NEMACIDE(73) OXAMYL, RATE SINGLE should read 82.1 not 2.1

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77/W/CS/34

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	14.3	15.8	20.3	16.8
CARBOFUR	13.2	21.1	20.5	18.3
PHOXIM	12.9	14.2	16.8	14.6
MEAN	13.4	17.0	19.2	16.6

RATE NONE 6.4

GRAND MEAN 15.5

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

TABLE	NEMACIDE(77)	RATE NEMACIDE(77)	RATE & RATE NONE
SED	1.68	1.68	2.91

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.56	22.9

PERCENTAGE 3.81CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	66.0	66.5	70.7	67.7
CARBOFUR	63.7	77.8	77.7	73.1
PHOXIM	61.1	59.7	69.0	63.3
MEAN	63.6	68.0	72.5	68.0

RATE NONE 48.7

GRAND MEAN 66.1

PLOT AREA HARVESTED 0.00130

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77/W/CS/34

POTATOES SERIES IV

TOTAL TUBERS TONNES/HECTARE

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

RATE / NEMACIDE(74)	5.5	11.2	22.4	MEAN
BENOMYL	9.7	15.7	13.3	12.9
CARBOFUR	9.5	12.4	14.6	12.2
THIABEND	9.0	9.4	17.0	11.8
MEAN	9.4	12.5	15.0	12.3

RATE 0.0 9.8

GRAND MEAN 12.0

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

TABLE	NEMACIDE(74)	RATE	NEMACIDE(74) RATE & RATE 0.0
SED	1.16	1.26	2.16

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	2.43	20.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

NEMACIDE(74)				
BENOMYL	49.2	64.5	53.7	55.8
CARBOFUR	51.3	56.1	69.8	59.1
THIABEND	42.6	45.1	64.6	50.7
MEAN	47.7	55.2	62.7	55.2

RATE 0.0 49.0

GRAND MEAN 54.6

PLOT AREA HARVESTED 0.00130

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77/W/CS/34

WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(76)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	2.85	3.37	2.88	3.04
CARBOFUR	2.49	2.35	2.34	2.39
PHOXIM	2.53	2.39	2.81	2.58
MEAN	2.62	2.70	2.68	2.67

RATE NONE 2.61

GRAND MEAN 2.66

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

TABLE	NEMACIDE(76)	RATE NEMACIDE(76)	RATE & RATE NONE
SED	0.139	0.139	0.241

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.296	11.1

GRAIN MEAN DM% 81.7

STRAW TONNES/HECTARE

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

RATE NEMACIIE(76)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	2.18	2.80	2.46	2.48
CARBOFUR	1.84	2.07	2.12	2.01
PHOXIM	2.04	2.22	2.33	2.20
MEAN	2.02	2.36	2.30	2.23

RATE NONE 2.21

GRAND MEAN 2.23

STRAW MEAN DM% 85.2

PLOT AREA HARVESTED 0.00260

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77/W/CS/34

BARLEY SERIES I

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(75)	SINGLE	DOUBLE	QUAD	MEAN
DURSBAN	4.21	4.35	4.46	4.34
PHOXIM	4.34	4.12	4.21	4.22
DACAMOX	4.36	4.16	4.12	4.21
MEAN	4.30	4.21	4.26	4.26

RATE NONE 3.63

GRAND MEAN 4.20

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

TABLE	NEMACIDE(75)	RATE NEMACIDE(75)	RATE & RATE NONE
SED	0.187	0.190	0.328

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.391	9.3

GRAIN MEAN DM% 79.1

STRAW TONNES/HECTARE

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

RATE NEMACIDE(75)	SINGLE	DOUBLE	QUAD	MEAN
DURSBAN	2.21	2.60	2.45	2.42
PHOXIM	2.52	2.20	2.01	2.24
DACAMOX	2.18	2.43	2.36	2.32
MEAN	2.30	2.41	2.27	2.33

RATE NONE 2.35

GRAND MEAN 2.33

STRAW MEAN DM% 75.3

PLOT AREA HARVESTED 0.00260

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77/W/CS/35

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on Globodera rostochiensis and yield of potatoes, residual effects are also studied - Woburn Stackyard AII.

Sponsor: A.G. Whitehead.

The sixth year, potatoes.

For previous years see 72/W/CS/35(t) and 73-76/W/CS/35.

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

Whole plot dimensions: 4.27 x 6.10.

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

	1968-71	1972	1973	1974	1975	1976	1977
Series I	P	P*	SB	B	P*	P	P
Series II	P	P	P*	SB	B	P*	P
Series III	P	P	P	P*	SB	B	P*

P = Potatoes, SB = Sugar beet, B = Barley

*Treatments applied to potatoes, following two crops test residual effects.

Treatments: All combinations of:-

1. Varieties and residual effects of varieties:

VARIETY	Series I	
	1972	1975-77
(PC)PC3	Pentland Crown	Pentland Crown
(MP)PC3	Maris Piper	Pentland Crown

VARIETY	Series II	
	1973	1976-77
(PC)PC2	Pentland Crown	Pentland Crown
(MP)PC2	Maris Piper	Pentland Crown

VARIETY	Series III	
	1974	1977
(PC)PC	Pentland Crown	Pentland Crown
(MP)PC	Maris Piper	Pentland Crown

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2. Nematicides (kg) and nematicide residues (applied to Series I 1975, Series II 1976, Series III 1977):

NEM RES(75)	Series I
NEM RES(76)	Series II
NEMACIDE(77)	Series III

NONE	None
	Dazomet (half before, half after autumn ploughing)
DAZ2	220
DAZ3	330
DAZ4	440
DAZ6	660
DAZ2+TE2	Dazomet, 220, 'Telone', 220, all after autumn ploughing
TE4	'Telone' 450 all after autumn ploughing
OX	Oxamyl 5.6 in spring
TE2+OX	'Telone' 220, after autumn ploughing, oxamyl 5.6 in spring

NOTE: Because of the wet autumn all nematicides were applied in the spring for Series III 1977.

Standard applications: Manures: Magnesian limestone at a total of 5 tonnes, in two equal applications, to Series II only. All series: (13:13:20) at 1860 kg Weedkiller: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Seed: Pentland Crown.

Cultivations, etc.:-

All Series: NPK applied: 6 Apr, 1977. Heavy-tine cultivated: 14 Apr. Weedkiller applied: 25 May. Fungicide applied: 23 June. Fungicide with insecticide applied: 8 July, 21 July, 12 Aug.

Series I: Heavy-tine cultivated three times: 22 Nov, 1976 and twice: 8 Mar, 1977. Rotary cultivated: 18 Apr. Potatoes planted: 19 Apr. Grubbed and earthed up: 25 May. Haulm mechanically destroyed: 26 Sept. Lifted: 5 Oct.

Series II: Heavy-tine cultivated: 22 Nov, 1976. Magnesian limestone applied: 26 Nov, 17 Jan, 1977. Heavy-tine cultivated twice: 8 Mar. Rotary cultivated: 18 Apr. Potatoes planted: 19 Apr. Grubbed and earthed up: 25 May. Haulm mechanically destroyed: 26 Sept. Lifted: 5 Oct.

Series III, Test Crop: Subsoiled, tines 140 cm apart and 50 cm deep: 7 Sept, 1976. Ploughed: 9 Nov. Spring-tine cultivated: 7 Mar, 1977. Dazomet applied and these plots only rotary cultivated, 'Telone' injected and all plots spring-tine cultivated: 14 Mar. Oxamyl applied and these plots only rotary cultivated, potatoes planted: 2 May. Haulm mechanically destroyed: 21 Oct. Lifted: 24 Oct.

NOTE: Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of Globodera rostochiensis.

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77/W/CS/35

POTATOES SERIES I

TOTAL TUBERS TONNES/HECTARE

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

VARIETY NEM RES(75)	(PC)PC3	(MP)PC3	MEAN
NONE	11.7	6.4	9.0
DAZ2	6.7	13.8	10.3
DAZ3	13.4	15.6	14.5
DAZ4	15.7	18.2	17.0
DAZ6	13.7	14.9	14.3
DAZ2+TE2	13.0	11.7	12.4
TE4	9.0	10.6	9.8
OX	10.1	16.4	13.2
TE2+OX	18.1	14.3	16.2
MEAN	12.4	13.5	13.0

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

TABLE	VARIETY NEM RES(75)		VARIETY NEM RES(75)
SED	0.95	2.07	2.92

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

STRATUM	DF	SE	CV%
BLOCK.WP	47	4.05	31.2

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

VARIETY NEM RES(75)	(PC)PC3	(MP)PC3	MEAN
NONE	70.4	61.4	65.9
DAZ2	56.0	69.4	62.7
DAZ3	76.0	75.1	75.6
DAZ4	78.4	76.7	77.6
DAZ6	74.4	73.5	73.9
DAZ2+TE2	77.7	71.1	74.4
TE4	66.9	66.9	66.9
OX	64.0	73.3	68.7
TE2+OX	76.2	72.9	74.5
MEAN	71.1	71.2	71.1

PLOT AREA HARVESTED 0.00087

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77/W/CS/35

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

VARIETY NEM RES(76)	(PC)PC2	(MP)PC2	MEAN
NONE	12.6	12.3	12.5
DAZ2	23.3	24.9	24.1
DAZ3	25.8	30.5	28.1
DAZ4	26.4	27.7	27.1
DAZ6	29.1	30.0	29.6
DAZ2+TE2	28.2	26.5	27.4
TE4	15.5	23.8	19.6
OX	24.1	26.9	25.5
TE2+OX	28.4	32.7	30.5
MEAN	23.7	26.1	24.9

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

TABLE	VARIETY NEM RES(76)	VARIETY NEM RES(76)
SED	0.98	2.19	3.09

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

STRATUM	DF	SE	CV%
BLOCK.WP	47	4.18	16.8

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

VARIETY NEM RES(76)	(PC)PC2	(MP)PC2	MEAN
NONE	65.0	66.7	65.8
DAZ2	84.5	86.6	85.6
DAZ3	86.9	84.8	85.8
DAZ4	88.4	86.1	87.2
DAZ6	87.0	87.9	87.4
DAZ2+TE2	87.0	86.4	86.7
TE4	74.9	83.5	79.2
OX	80.5	83.9	82.2
TE2+OX	88.1	88.5	88.3
MEAN	82.5	83.8	83.2

PLOT AREA HARVESTED 0.00087

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77/W/CS/35

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

VARIETY NEMACIDE(77)	(PC)PC	(MP)PC	MEAN
NONE	30.2	34.9	32.5
DAZ2	46.6	47.7	47.2
DAZ3	50.7	51.8	51.3
DAZ4	49.9	55.9	52.9
DAZ6	53.0	56.5	54.8
DAZ2+TE2	53.5	55.5	54.5
TE4	41.4	47.0	44.2
OX	47.2	45.6	46.4
TE2+OX	50.4	50.9	50.7
MEAN	47.0	49.5	48.3

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

TABLE	VARIETY NEMACIDE(77)		VARIETY NEMACIDE(77)
SED	0.86	1.92	2.70

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

STRATUM	DF	SE	CV%
BLOCK.WP	46	3.63	7.5

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

VARIETY NEMACIDE(77)	(PC)PC	(MP)PC	MEAN
NONE	84.7	88.0	86.3
DAZ2	92.6	89.8	91.2
DAZ3	89.7	91.7	90.7
DAZ4	92.5	91.0	91.7
DAZ6	90.6	90.3	90.4
DAZ2+TE2	90.9	92.3	91.6
TE4	90.2	89.9	90.1
OX	91.0	88.8	89.9
TE2+OX	93.4	92.0	92.7
MEAN	90.6	90.4	90.5

PLOT AREA HARVESTED 0.00087

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77/R/CS/41

CULTIVATIONS AND SOIL INVERTEBRATES

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

Sponsor: C.A. Edwards.

The ninth year, old grass, new grass.

For previous years see 69/R/CS/41(t), 70/R/CS/41(t) and 71-76/R/CS/41.

Design: 4 blocks of 8 plots, randomisation restricted.

Whole plot dimensions: 6.40 x 7.32.

Treatments: Cultivations and reseeding:

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

Seeds mixture for 1977: S.48 timothy at 6.7 kg. S.215 meadow fescue at 13.5 kg. New Zealand white clover at 2.2 kg. Sown at 22.4 kg.

Basal applications: Manures: (0:14:28) at 500 kg in winter. (25:0:16) at 440 kg in spring and at 220 kg after the first two cuts. Weedkiller: MCPB ('Tropotox' at 7.0 l in 340 l) to SFR, SMR, AMR plots only.

Cultivations, etc.:- AMR plots topped and ploughed: 1 Oct, 1976. Basal PK applied: 13 Dec. SMR and SFR plots ploughed: 28 Feb, 1977. Basal NK applied: 3 Mar. Cut (excluding AMR, SMR, SFR plots): 25 May, 21 July. Rotary cultivated AMR, SMR, SFR plots: 27 May. Disced AMR, SMR plots three times, SFR plots once, harrowed and rolled: 31 May. AMR, SMR, SFR plots sown, harrowed and rolled: 1 June. NK applied to all cut plots: 31 May, 29 July. Weedkiller applied: 27 July. All plots cut: 24 Nov.

NOTE: Soil cores were taken to assess total soil fauna and quadrats were sampled on each plot for earthworms in spring and early winter 1977.

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77/R/CS/41

1ST CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	MEAN
	4.51	3.83	3.56	5.27	4.34

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

TABLE	CULTIVTN	
SED	0.436	MIN REP
	0.378	MAX-MIN

	CULTIVTN
MAX-MIN	0 V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	13	0.617	14.2

1ST CUT MEAN DM% 18.9

2ND CUT (21/7/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	MEAN
	2.72	3.78	3.83	3.66	3.34

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

TABLE	CULTIVTN	
SED	0.282	MIN REP
	0.244	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	13	0.399	11.9

2ND CUT MEAN DM% 25.6

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77/R/CS/41

3RD CUT (24/11/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	SFR	SMR	AMR	MEAN
	2.58	2.42	2.24	3.11	3.70	4.03	2.93	2.95

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

TABLE	CULTIVTN	
SED	0.475	MIN REP
	0.412	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.672	22.8

3RD CUT MEAN DM% 22.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	SFR	SMR	AMR	MEAN
	9.81	10.03	9.62	12.05	3.70	4.03	2.93	7.75

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

TABLE	CULTIVTN	
SED	0.650	MIN REP
	0.563	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.919	11.9

TOTAL OF 3 CUTS MEAN DM% 16.8

PLOT AREA HARVESTED 0.00074

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77/W/CS/66

DAZOMET AND NITROGEN

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

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

The seventh year, maize.

For previous years see 71/W/CS/66(t), 72/W/CS/66(t) and 73-76/W/CS/66.

Design: 4 blocks of 2 plots split into 4.

Whole plot dimensions: 2.13 x 16.5.

Treatments: All combinations of:-

Whole plots

1. DAZOMET — Dazomet (kg per annum) cumulative 1971-77:

0
450

Sub plots

2. N — Nitrogen fertiliser (kg N per annum) cumulative 1971-77:

50	50 to seedbed
100	100 to seedbed
150	150 to seedbed
100+50	100 to seedbed, 50 five weeks after emergence

Basal applications: Manures: (0:14:28) at 1000 kg. Weedkiller: Atrazine at 1.1 kg in 340 l.

Seed: Anjou 210, sown at 103,300 seeds per ha.

Cultivations, etc.:- Ploughed: 23 Nov, 1976. Dazomet applied, rotary cultivated: 4 Apr, 1977. PK applied: 7 Apr. Weedkiller applied: 11 May. Spring-tine cultivated with crumbler attached twice, seed sown, fine tooth harrowed: 19 May. Seedbed N applied: 24 May. Late N applied: 27 July. Hand harvested: 26 Oct.

NOTES: (1) Soil samples were taken in spring before sowing and after harvest for counts of ectoparasitic nematodes.
(2) Counts were made of common smut (Ustilago maydis) and stalk rots (Fusarium spp.).

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77/W/CS/66

FORAGE DRY MATTER TONNES/HECTARE

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

N DAZOMET	50	100	150	100+50	MEAN
0	7.85	7.63	8.60	7.85	7.98
450	9.87	10.58	9.72	9.48	9.91
MEAN	8.86	9.10	9.16	8.67	8.95

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

TABLE	N	DAZOMET* N
SED	0.652	0.922

* WITHIN THE SAME LEVEL OF DAZOMET ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	1.304	14.6

MEAN DM% 19.2

SUB PLOT AREA HARVESTED 0.00039

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77/R/CS/90

CULTIVATIONS FOR CEREALS

Object: To study the engineering aspects - power requirements, rate of work, revenue and costs - of different tillage systems for continuous wheat. Effects on weeds, soil pathogens and yields are also studied - Meadow.

Sponsors: D.E. Patterson (N.I.A.E.), R. Moffitt, R.D. Prew, C.A. Edwards.

The sixth year, winter wheat.

For previous years see 72-76/R/CS/90.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 13.7 x 33.8.

Treatments

TILLAGE	Tillage systems:-
1	Three passages of the tractor (three-pass system): Ploughed* 20 cm deep (8 inches): disc harrowed: drilled.
2	Three-pass system: Chisel-ploughed once* 15 cm deep (6 inches): disc harrowed: drilled.
3	Two-pass system: Ploughed* 20 cm deep: spring-tine cultivated and drilled.
4	Two-pass system: Ploughed* 10 cm deep: spring-tine cultivated and drilled.
5	Two-pass system: Sprayed with paraquat (0.56 kg ion in 220 l on 20 Oct, 1976): spring-tine cultivated and drilled.
6	Three-pass system: Heavy spring-tine cultivated* 15 cm deep: disc harrowed: spring-tine cultivated and drilled.
7	Two-pass system (stubble of 1976 crop burnt on 16 Aug): Heavy spring-tine cultivated* 15 cm deep: spring tine cultivated and drilled.
8	Two-pass system: Sprayed with paraquat (0.56 kg ion in 220 l on 20 Oct): direct drilled.
9	Three-pass system: Rotary digger (N.I.A.E.) cultivated*: disc harrowed: spring-tine cultivated and drilled.
10	Two-pass system (stubble of 1976 crop burnt on 16 Aug): Rotary digger (N.I.A.E.) cultivated*: spring-tine cultivated and drilled.

NOTE: Rotary digger (N.I.A.E.) - depth of working: rotor 10 cm, tines 20 cm.

* Cultivations done on 30 Sept, 1976. Three plots of TILLAGE 1, two of TILLAGE 2 and one each of TILLAGE 3, 6 and 10 received remaining cultivations and were sown on 21 Oct. TILLAGE 8 plots sown on 2 Nov. All remaining cultivations and drilling done on 3 Nov, and these plots only disc harrowed. A disc drill was used on all treatments except 8.

Basal applications: Manures: Chalk at 7.5 t. (10:24:24) at 250 kg, combine drilled. 'Nitro-Chalk' at 400 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l, methabenzthiazuron at 3.1 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Seed: Maris Huntsman, sown at 160 kg.

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. Paraquat applied: 27 Sept. Methabenzthiazuron applied: 19 Nov. N applied: 8 Apr, 1977. Insecticide applied: 13 July. Combine harvested: 7 Sept.

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77/R/CS/90

NOTES: Observations and determinations were made as follows:-
(1) Soil: Structure assessments, photographs for aggregate size, moisture determinations.
(2) Implements: Depth and width of work, forward speed, wheel slip and power requirements.
(3) Crop: Plant and tiller counts, number of ears and grains per ear, disease and pest assessments, aerial photographs.

GRAIN TONNES/HECTARE

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

TILLAGE	1	2	3	4	5	6	7	8	9	10	MEAN
	5.24	5.04	5.18	5.35	4.74	4.79	5.16	4.49	5.02	5.27	5.03

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

TABLE	TILLAGE
SED	0.197

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.242	4.8

GRAIN MEAN DM% 81.0

PLOT AREA HARVESTED 0.01031

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77/W/CS/99

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study the phenomenon of take-all (Gaeumannomyces graminis) decline in barley - Woburn Butt Furlong.

Sponsor: D. Hornby.

The sixth year, barley, spring beans.

For previous years see 72/W/CS/99(t) and 73-76/W/CS/99.

Design: 2 blocks of 9 plots.

Whole plot dimensions: 5.33 x 15.2.

Treatments: Previous crops:-

PREVCROP	1968-71	1972	1973	1974	1975	1976	
BBBBB	B	B	B	B	B	B	(2 plots/block)
FBBBB	B	F	B	B	B	B	
FBEBBB	B	F	BE	B	B	B	
BFBEBB	B	B	F	BE	B	B	
BBFBEB	B	B	B	F	BE	B	
BBBBFBE	B	B	B	B	F	BE	

B = Barley, BE = Beans, F = Fallow

Standard applications:
Barley: Manures: (20:14:14) at 420 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.
Spring beans: Manures: (0:14:28) at 400 kg. Insecticide: Pirimicarb at 0.14 kg in 340 l.

Seed: Barley: Julia, dressed with ethirimol, sown at 160 kg.
Spring beans: Minden, sown at 220 kg.

Cultivations, etc.:-
All plots: Ploughed: 1 Nov, 1976. Spring-tine cultivated: 7 Mar, 1977. Spring-tine cultivated with crumbler attached: 8 Mar.
Barley: Seed sown: 9 Mar, 1977. Weedkiller applied: 15 May. Combine harvested: 15 Aug.
Spring beans: Spring-tine cultivated: 17 Aug, 1976. PK applied: 30 Mar, 1977. Fine-tooth harrowed: 10 May. Tractor hoed: 30 May. Insecticide applied: 20 July. Combine harvested: 12 Sept.
Fallow: Rotary cultivated: 4 May, 1977. Spring-tine cultivated: 30 May. Rotary cultivated: 8 July.

NOTES: (1) Soil samples were taken before sowing and after harvest and plant samples in July for incidence of take-all (Gaeumannomyces graminis).
(2) Yields of spring beans were not taken.
(3) An examination of the results shcwed a fertility trend coinciding with the contours of the field. The yields presented have been adjusted for this trend. The yields for the years 1972-76 have also been adjusted and the revised figures are presented.

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77/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	BBBBB	FBBBB	FBEBBB	BFBEBB	BBFBEB	BBBBFBE	MEAN
	3.14	3.91	3.47	3.92	4.26	4.03	3.79

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

TABLE	PREVCROP	
SED	0.245	MIN REP
	0.212	MAX-MIN

PREVCROP
MAX-MIN BBBBB V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.229	6.2

GRAIN MEAN DM% 79.7

PLOT AREA HARVESTED 0.00434

76/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	B/B/B/B	F/B/B/B	F/BE/B/B	B/F/BE/B	B/B/F/BE	MEAN
	1.71	2.03	1.93	2.13	2.61	1.98

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

TABLE	PREVCROP	
SED	0.311	MIN REP
	0.254	MAX-MIN

PREVCROP
MAX-MIN B/B/B/B V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.299	15.1

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75/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	B/B/B/B	B/F/B/B	B/F/BE/B	B/B/F/BE	MEAN
	1.49	2.02	2.20	1.94	1.73

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

TABLE	PREVCROP	
SED	0.216	MIN REP
	0.170	MAX-MIN

PREVCROP
MAX-MIN B/B/B/B V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.207	12.0

74/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	B/B/B	B/F/B	B/F/BE	MEAN
	4.00	4.26	4.18	4.06

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

TABLE	PREVCROP	
SED	0.287	MIN REP
	0.223	MAX-MIN

PREVCROP
MAX-MIN B/B/B V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.284	7.0

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73/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP	B/B	B/F	MEAN
	3.86	4.49	3.95

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

TABLE	PREVCROP
SED	0.202

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.263	6.7

72/W/CS/99

BARLEY

GRAIN TONNES/HECTARE

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

CS	1	4	5	6	7	8	9	MEAN
	3.67	4.28	3.86	3.57	4.05	4.30	4.12	3.98

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

TABLE	CS
SED	0.577

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.492	12.4

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77/R/CS/130

EFFECTS OF EARTHWORM INOCULATION

Object: To study the effects of different species of earthworms on yield and other characteristics of grass - Fosters O & E.

Sponsor: J.R. Lofty.

The fourth year, ley.

For previous years see 74-76/R/CS/130.

Design: 3 blocks of 4 plots.

Whole plot dimensions: 8.53 x 9.14.

Treatments: Inoculation with earthworm species in 1974 and 1975:

WORMSPEC	
NONE	None
ALLOLOBO	Allolobophora longa at 15,000 per hectare in 1974; 5,000 in 1975
LUMBRICU	Lumbricus terrestris at 5,000 per hectare in 1974 and 1975
SIX SPEC	Six species - A. caliginosa, A. chlorotica, A. longa, A. rosea, L. rubellus, L. terrestris at a total of 35,000 per hectare in 1974, 12,000 in 1975

NOTE: The experiment was ploughed in error in July 1976 and resown in autumn 1976.

Basal applications: Manures: (0:14:28) at 500 kg, (25:0:16) at 440 kg in spring, (25:0:16) at 220 kg after the first two cuts.

Seeds mixture: Combi perennial ryegrass at 8.4 kg, S24 perennial ryegrass at 8.4 kg, S23 perennial ryegrass at 5.6 kg, S26 cocksfoot at 5.6 kg, S37 cocksfoot at 5.6 kg, S48 Timothy at 2.8 kg, Pecora Timothy at 2.8 kg, Huia white clover at 2.8 kg, wild white clover at 2.8 kg. Sown at 45 kg.

Cultivations, etc.:- Rotary cultivated, spring-tine harrowed, sown and harrowed: 21 Sept, 1976. PK applied: 23 Dec. Spring NK applied: 4 Mar, 1977. Cut three times: 24 May, 21 July, 21 Nov. NK applied: 27 May, 27 July.

NOTE: Earthworm populations were assessed in spring 1977.

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77/R/CS/130

1ST CUT (24/5/77) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	3.44	3.30	3.35	4.01	3.52

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

TABLE	WORMSPEC
SED	0.530

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.649	18.4

1ST CUT MEAN DM% 16.7

2ND CUT (21/7/77) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	4.24	5.06	4.14	3.82	4.31

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

TABLE	WORMSPEC
SED	0.816

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.999	23.2

2ND CUT MEAN DM% 27.9

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77/R/CS/130

3RD CUT (21/11/77) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	4.77	4.49	4.55	4.49	4.58

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

TABLE	WORMSPEC
SED	0.324

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.397	8.7

3RD CUT MEAN DM% 23.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	12.45	12.85	12.04	12.32	12.42

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

TABLE	WORMSPEC
SED	1.306

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	1.599	12.9

TOTAL OF 3 CUTS MEAN DM% 22.8

PLOT AREA HARVESTED 0.00046

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77/R/CS/131

EFFECTS OF EARTHWORM DESTRUCTION

Object: To study the effects of eliminating earthworms on yield and soil structure of old grass - Appletree.

Sponsor: J.R. Lofty.

The fourth year, old grass.

For previous years see 74-76/R/CS/131.

Design: 4 blocks of 4 plots.

Whole plot dimensions: 7.62 x 7.62.

Treatments: Chemicals:-

CHEMICAL	
NONE	None (duplicated)
BENOMYL	Benomyl at 5 kg in 1974 and at 2.5 kg in 1976
CHLORDAN	Chlordane at 10 kg in 1974 only

Basal applications: Manures: (0:14:28) at 500 kg in winter. (25:0:16) at 440 kg in spring and at 220 kg after the first two cuts.

Cultivations, etc.:- PK applied: 13 Dec, 1976. NK applied: 3 Mar, 1977, 31 May, 1 Aug. Cut three times: 25 May, 21 July, 14 Nov.

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77/R/CS/131

1ST CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	3.75	3.87	3.92	3.82

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

TABLE	CHEMICAL	
SED	0.124	MIN REP
	0.107	MAX-MIN

	CHEMICAL
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.175	4.6

1ST CUT MEAN DM% 17.8

2ND CUT (21/7/77) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	5.04	4.69	4.81	4.89

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

TABLE	CHEMICAL	
SED	0.262	MIN REP
	0.227	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.371	7.6

2ND CUT MEAN DM% 23.8

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77/R/CS/131

3RD CUT (14/11/77) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	2.86	2.51	2.90	2.78

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

TABLE	CHEMICAL	
SED	0.388	MIN REP
	0.336	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.549	19.7

3RD CUT MEAN DM% 21.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	11.65	11.07	11.64	11.50

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

TABLE	CHEMICAL	
SED	0.423	MIN REP
	0.366	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.598	5.2

TOTAL OF 3 CUTS MEAN DM% 21.0

PLOT AREA HARVESTED 0.00046

https://doi.org/10.23637/ERADOC-1-29 *pp 172*

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77/R/CS/133

CONTROL OF PATHOGENS

Object: To study the effects of a range of chemicals on incidence of pathogens and yield of continuous maize - Long Hoos VI/VII 6.

Sponsors: A.J. Barnard, K.E. Fletcher, D.J. Hooper, D. Hornby, R.T. Plumb, T.D. Williams, J.C. Wilson.

The fourth year, forage maize.

For previous years see 74-76 R/CS/133.

Design: 3 randomised blocks of 9 plots split into 3.

Whole plot dimensions: 2.13 x 18.3.

Treatments: All combinations of:-

Whole plots

1. CHEMICAL	Chemicals applied annually except where stated:	
	NONE	None (4 plots per block)
	ALDICARB	Aldicarb, 4.5 kg as granules to seedbed
	BENOMYL	Benomyl, 11.2 kg as dust to seedbed
	DAZOMET	Dazomet, 450 kg as granules in early spring (not applied 1975)
	PHORATE	Phorate, 1.68 kg as granules to seedbed
	BE/DA/PH	Benomyl + dazomet (not applied 1975) + phorate, at above rates and times

Sub plots

2. N	Nitrogen fertiliser (kg N):
	50
	100
	150

Basal applications: Manures: (0:14:28) at 970 kg. Weedkiller: Atrazine at 1.7 kg in 220 l.

Seed: Caldera 535, sown at 100,000 seeds per ha.

Cultivations, etc.:- Rotary cultivated twice: 26 Nov, 1976. PK applied: 13 Dec. Ploughed: 1-28 Feb, 1977. Dazomet applied and these plots only rotary cultivated: 11 Mar. Power harrowed: 25 Apr. Aldicarb, benomyl and phorate treatments applied, all plots rotary cultivated: 11 May. Seed sown: 18 May. N applied: 24 May. Weedkiller applied: 20 June. Harvested by hand: 8-10 Nov.

NOTES: (1) Germination counts were made in June.
(2) Frit fly (Oscinella frit) damage was assessed.
(3) Nitrogen percentages of forage samples were determined.

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77/R/CS/133

FORAGE DRY MATTER TONNES/HECTARE

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

CHEMICAL N	NONE	ALDICARB	BENOMYL	DAZOMET	PHORATE	BE/DA/PH	MEAN
50	7.57	7.44	7.63	8.95	7.50	9.33	7.90
100	8.78	7.97	7.83	9.28	8.43	9.07	8.63
150	8.68	9.85	8.95	9.83	9.66	10.35	9.26
MEAN	8.34	8.42	8.14	9.35	8.53	9.59	8.60

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

TABLE	N	CHEMICAL	N CHEMICAL	
SED		0.717	0.941	MIN REP
	0.249	0.567	0.744	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CHEMICAL			0.746	MIN REP
			0.373	MAX REP

CHEMICAL
MAX REP WITHIN NONE
MAX-MIN NONE V REMAINDER
MIN REP REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	19	0.879	10.2
BLOCK.WP.SP	42	0.914	10.6

MEAN DM% 20.3

SUB PLOT AREA HARVESTED 0.00059

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77/R/CS/140

CHEMICAL REFERENCE PLOTS

Object: To study the persistence in soil of four agricultural chemicals applied annually, singly and in combination and their effects on soil microflora and on yield of continuous barley - Long Hoos V 3.

Sponsors: G.G. Briggs, N. Walker, R. MacDonald.

The fourth year, barley.

For previous years see 74-76/R/CS/140.

Design: Two replicates of 2 x 2 x 2 x 2 fully randomised.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively 1974-77 except WEEDKLLR - 1974 and 76 only:
All combinations of:-

1. FUNGICIDE Fungicide:

   NONE None
   BENOMYL Benomyl at 4 kg applied 10 Mar, 1977

2. INSCTCDE Insecticide:

   NONE None
   CHLORFEN Chlorfenvinphos at 2 kg applied 10 Mar

3. NEMACIDE Nematicide:

   NONE None
   ALDICARB Aldicarb at 6 kg applied 10 Mar

4. WEEDKLLR Weedkiller:

   NONE None
   CHLORTOL Chlortoluron at 2 kg applied 1974 and 1976 only

NOTE: Chemicals applied to the seedbed.

Basal applications: Manures: (0:14:28) at 880 kg, 'Nitro-Chalk' at 500 kg.
Weedkillers: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 5.6 l in 340 l).

Seed: Julia (undressed), sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated: 13 Sept, 1976. PK applied: 8 Nov.
Ploughed: 9 Nov-14 Dec. N applied, spring-tine cultivated: 9 Mar, 1977.
Power harrowed: 10 Mar. Seed sown: 11 Mar. Weedkillers applied: 23 May.
Combine harvested: 29 Aug.

NOTE: Mildew and aphids were assessed during the season.

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77/R/CS/140

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE			
NONE	4.89	4.53	4.71
BENOMYL	4.98	4.67	4.83
MEAN	4.93	4.60	4.77

NEMACIDE	NONE	ALDICARB	MEAN
FUNGCIDE			
NONE	4.56	4.87	4.71
BENOMYL	4.41	5.24	4.83
MEAN	4.48	5.05	4.77

NEMACIDE	NONE	ALDICARB	MEAN
INSCTCDE			
NONE	4.72	5.15	4.93
CHLORFEN	4.25	4.96	4.60
MEAN	4.48	5.05	4.77

WEEDKLLR	NONE	CHLORTOL	MEAN
FUNGCIDE			
NONE	4.83	4.59	4.71
BENOMYL	5.05	4.60	4.83
MEAN	4.94	4.60	4.77

WEEDKLLR	NONE	CHLORTOL	MEAN
INSCTCDE			
NONE	4.93	4.94	4.93
CHLORFEN	4.95	4.26	4.60
MEAN	4.94	4.60	4.77

WEEDKLLR	NONE	CHLORTOL	MEAN
NEMACIDE			
NONE	4.78	4.18	4.48
ALDICARB	5.09	5.01	5.05
MEAN	4.94	4.60	4.77

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE				
NONE	4.77	5.01	4.34	4.72
BENOMYL	4.66	5.30	4.15	5.19

INSCTCDE	NONE		CHLORFEN	
WEEDKLLR	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE				
NONE	4.81	4.97	4.85	4.22
BENOMYL	5.05	4.91	5.05	4.29

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77/R/CS/140

GRAIN TONNES/HECTARE

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

NEMACIDE	NONE		ALDICARB	
WEEDKLLR	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE				
NONE	4.79	4.32	4.87	4.86
BENOMYL	4.78	4.04	5.32	5.17

NEMACIDE	NONE		ALDICARB	
WEEDKLLR	NONE	CHLORTOL	NONE	CHLORTOL
INSCTCDE				
NONE	4.77	4.66	5.09	5.21
CHLORFEN	4.80	3.70	5.10	4.82

	NEMACIDE	NONE		ALDICARB	
	WEEDKLLR	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE	INSCTCDE				
NONE	NONE	4.78	4.75	4.84	5.18
	CHLORFEN	4.80	3.89	4.90	4.55
BENOMYL	NONE	4.75	4.58	5.34	5.25
	CHLORFEN	4.80	3.50	5.29	5.09

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

TABLE	FUNGCIDE	INSCTCDE	NEMACIDE	WEEDKLLR
SED	0.148	0.148	0.148	0.148

TABLE	FUNGCIDE INSCTCDE	FUNGCIDE NEMACIDE	INSCTCDE NEMACIDE	FUNGCIDE WEEDKLLR
SED	0.209	0.209	0.209	0.209

TABLE	INSCTCDE WEEDKLLR	NEMACIDE WEEDKLLR	FUNGCIDE INSCTCDE NEMACIDE	FUNGCIDE INSCTCDE WEEDKLLR
SED	0.209	0.209	0.296	0.296

TABLE	FUNGCIDE NEMACIDE WEEDKLLR	INSCTCDE NEMACIDE WEEDKLLR	FUNGCIDE INSCTCDE NEMACIDE WEEDKLLR
SED	0.296	0.296	0.419

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

STRATUM	DF	SE	CV%
WP	16	0.419	8.8

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00075

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77/W/CS/159

METHODS OF INCORPORATING NEMATICIDES

Object: To study the effects of several methods of incorporating nematicides into the soil on the incidence of Globodera rostochiensis and on the yield of potatoes - Woburn Butt Close I.

Sponsors: A.G. Whitehead, R.H. Bromilow.

The fourth year, potatoes.

For previous years see 74/W/P/3 and 75-76/W/CS/159.

Design: 2 randomised blocks of 2 plots split into 16.

Whole plot dimensions: 2.84 x 9.14.

Treatments: All combinations of:-

Whole plots

1. IRRIGTN	Irrigation:
NONE	None
FULL	Full (137.5 mm)

Sub plots

2. OXAMYL	Oxamyl nematicide (kg) (ignoring previous nematicide treatments):
4.5	
9.0	
3. METHOD	Method of applying oxamyl:
S/RV	To surface of soil, rotary cultivated in
W/RR	Injected through tines set 25 cm apart, cultivated by 'Roterra' (a rotary cultivator with blades revolving around a vertical axis)
C+W/RR	Injected, half through tines set 12.5 cm apart, half through tines set 25 cm apart, cultivated by 'Roterra'
S+C+W/RR	One third applied to surface of soil, one third injected through tines set 12.5 cm apart, one third injected through tines set 25 cm apart, cultivated by 'Roterra'

plus eight extra treatments on sub-plots:-

EXTRA	These treatments ignore previous nematicide treatments except as stated:
	None in 1977:
NONE- RR	None in previous years, cultivated by 'Roterra'
NONE+ RR	Given nematicides in previous years, cultivated by 'Roterra'
NONE+ RV	Given nematicides in previous years, rotary cultivated

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77/W/CS/159

Oxamyl (kg) to soil surface, rotary cultivated in:

OX 2S RV	2.25
OX 7S RV	6.70

Aldicarb (kg) to soil surface, rotary cultivated in:

AL 2S RV	2.25
AL 4S RV	4.50
AL 9S RV	9.00

Irrigation treatments 1977 (mm water):

12 July	12.5
14 July	12.5
18 July	25.0
19 July	12.5
21 July	12.5
26 July	12.5
28 July	25.0
1 Aug	12.5
5 Aug	12.5
Total	137.5

Basal applications: Manures: (13:13:20) at 1860 kg. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Seed: Pentland Crown.

Cultivations, etc.:- Heavy-tine cultivated: 22 Nov, 1976. Ploughed: 17 Feb, 1977. NPK applied: 5 Apr. Spring-tine cultivated with crumbler attached: 18 Apr. Treatments applied: 19-21 Apr. Potatoes planted: 21 Apr. Grubbed: 2 May. Fungicide applied: 24 June, 8 July, 21 July, 12 Aug. Insecticide applied: 8 July, 21 July, 12 Aug. Hand weeded: 26 Aug. Haulm mechanically destroyed: 21 Sept. Lifted: 3-4 Oct.

NOTES: (1) Soil samples were taken in spring before treatments were applied and and after harvest in autumn for cyst and egg counts of Globodera rostochiensis and G. pallida.

(2) One plot with treatment combinations

IRRIGTN FULL
EXTRA AL 2S RV

did not receive the correct treatments over the whole of the area harvested. An estimated value was used in the analysis.

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77/W/CS/159

TOTAL TUBERS TONNES/HECTARE

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

OXAMYL	4.5	9.0	MEAN
IRRIGTN			
NONE	25.4	27.8	26.6
FULL	38.7	39.7	39.2
MEAN	32.0	33.7	32.9

METHOD	S/RV	W/RR	C+W/RR	S+C+W/RR	MEAN
IRRIGTN					
NONE	25.4	23.3	29.7	27.9	26.6
FULL	40.0	39.7	36.6	40.3	39.2
MEAN	32.7	31.5	33.2	34.1	32.9

METHOD	S/RV	W/RR	C+W/RR	S+C+W/RR	MEAN
OXAMYL					
4.5	29.2	32.6	32.4	34.0	32.0
9.0	36.2	30.4	34.0	34.2	33.7
MEAN	32.7	31.5	33.2	34.1	32.9

	METHOD	S/RV	W/RR	C+W/RR	S+C+W/RR
IRRIGTN	OXAMYL				
NONE	4.5	24.9	22.3	26.9	27.5
	9.0	25.9	24.2	32.6	28.4
FULL	4.5	33.4	42.8	37.8	40.6
	9.0	46.5	36.7	35.4	40.1

IRRIGTN	NONE	FULL	MEAN
EXTRA			
NONE- RR	7.5	19.9	13.7
NONE+ RR	14.1	27.0	20.5
NONE+ RV	12.1	37.8	25.0
OX 2S RV	30.1	44.4	37.3
OX 7S RV	28.0	42.9	35.4
AL 2S RV	22.6	40.1	31.4
AL 4S RV	27.8	43.7	35.7
AL 9S RV	27.6	39.8	33.7
MEAN	21.2	37.0	29.1

GRAND MEAN 31.0

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

TABLE	EXTRA	OXAMYL	METHOD	IRRIGTN* EXTRA
SED	3.53	1.77	2.50	4.99

TABLE	IRRIGTN* OXAMYL	IRRIGTN* METHOD	OXAMYL METHOD	IRRIGTN* OXAMYL METHOD
SED	2.50	3.53	3.53	4.99

*WITHIN THE SAME LEVEL OF IRRIGTN

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77/W/CS/159

TOTAL TUBERS TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	29	4.99	16.1

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

OXAMYL IRRIGTN	4.5	9.0	MEAN
NONE	85.7	85.4	85.6
FULL	93.1	92.6	92.9
MEAN	89.4	89.0	89.2

METHOD IRRIGTN	S/RV	W/RR	C+W/RR	S+C+W/RR	MEAN
NONE	84.0	84.2	87.7	86.3	85.6
FULL	93.2	92.9	91.5	93.9	92.9
MEAN	88.6	88.6	89.6	90.1	89.2

METHOD OXAMYL	S/RV	W/RR	C+W/RR	S+C+W/RR	MEAN
4.5	88.1	89.3	89.3	91.1	89.4
9.0	89.1	87.8	89.9	89.1	89.0
MEAN	88.6	88.6	89.6	90.1	89.2

IRRIGTN	METHOD OXAMYL	S/RV	W/RR	C+W/RR	S+C+W/RR
NONE	4.5	83.9	84.5	87.0	87.5
	9.0	84.2	84.0	88.4	85.2
FULL	4.5	92.3	94.0	91.5	94.7
	9.0	94.0	91.7	91.4	93.1

IRRIGTN EXTRA	NONE	FULL	MEAN
NONE- RR	60.3	90.7	75.5
NONE+ RR	80.1	92.1	86.1
NONE+ RV	72.6	93.6	83.1
OX 2S RV	86.5	93.4	90.0
OX 7S RV	82.8	94.5	88.6
AL 2S RV	79.3	94.8	87.0
AL 4S RV	85.0	93.4	89.2
AL 9S RV	84.5	94.4	89.4
MEAN	78.9	93.4	86.1

GRAND MEAN 87.7

SUB PLOT AREA HARVESTED 0.00130

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77/R/CS/161

INJECTED N

Object: To study the cumulative and residual effects of injecting aqueous urea, with or without a nitrification inhibitor, at three rates and two spacings on the yield and nitrogen uptake of old grass cut for silage - Highfield IX.

Sponsors: F.V. Widdowson, A. Penny, J. Ashworth.

The third year, old grass.

For previous years see 76/R/CS/161.

Design: 2 randomised blocks of 18 plots split into 2.

Whole plot dimensions: 4.27 x 15.2.

Treatments: All combinations of:-

Whole plots

1. LIQUID N	Liquid nitrogen fertiliser:
UREA	Aqueous solution of urea, no nitrification inhibitor
UREA+INH	Aqueous solution of urea plus a nitrification inhibitor (ammonium trithiocarbonate in 1976, sodium trithiocarbonate in 1977)
2. SPACING	Spacing between tines injecting liquid fertiliser:
30 CM	
60 CM	
3. N RATE	Rate of liquid fertiliser, applied as a single annual dressing (kg N):
250	
375	
500	

Sub plots

4. YEARS	Years of application, cumulative when applied:
75-77	1975-77
75-76	1975-76 only
SOLID N	plus six whole plots given 'Nitro-Chalk', dressing divided between cuts (kg N, total/annum):
0	
100	
200	
300	
400	
500	

with sub plots YEARS as above.

NOTES: (1) The whole area was grazed in 1975, yields were not taken.
(2) Sodium trithiocarbonate was applied at 18 kg to SPACING, 30 CM and at 9 kg to SPACING, 60 CM.

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77/R/CS/161

Basal applications: Manures: (0:14:28) at 1000 kg.

Cultivations, etc.:- PK applied: 13 Dec, 1976. Aqueous urea and inhibitors injected: 4 Mar, 1977. 'Nitro-Chalk' applied: 10 Mar, 6 May, 2 June, 1 July, 8 Aug, 6 Sept. Cut: 4 May, 31 May, 30 June, 2 Aug, 5 Sept, 8 Nov.

NOTE: Grass samples were taken for N determinations.

1ST CUT (4/5/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	0.92	0.96	0.94
UREA+INH	0.93	0.76	0.85
MEAN	0.93	0.86	0.89

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.95	0.97	0.91	0.94
UREA+INH	0.89	0.82	0.82	0.85
MEAN	0.92	0.89	0.87	0.89

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.95	0.90	0.94	0.93
60 CM	0.89	0.89	0.80	0.86
MEAN	0.92	0.89	0.87	0.89

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	1.42	0.47	0.94
UREA+INH	1.25	0.44	0.85
MEAN	1.33	0.45	0.89

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	1.51	0.34	0.93
60 CM	1.15	0.56	0.86
MEAN	1.33	0.45	0.89

YEARS	75-77	75-76	MEAN
N RATE			
250	1.44	0.40	0.92
375	1.31	0.48	0.89
500	1.25	0.48	0.87
MEAN	1.33	0.45	0.89

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77/R/CS/161

1ST CUT (4/5/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.90	0.97	0.89	0.99	0.96	0.92
UREA+INH	1.00	0.82	0.98	0.78	0.82	0.67

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	1.51	0.34	1.33	0.59
UREA+INH	1.52	0.34	0.98	0.54

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	1.51	0.38	1.39	0.54	1.35	0.47
UREA+INH	1.37	0.42	1.22	0.41	1.15	0.49

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	1.60	0.30	1.44	0.35	1.50	0.37
60 CM	1.28	0.50	1.17	0.60	1.01	0.59

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	1.52	0.29	1.53	0.42	1.47	0.32
	60 CM	1.50	0.48	1.25	0.67	1.23	0.62
UREA+INH	30 CM	1.68	0.32	1.35	0.28	1.53	0.43
	60 CM	1.05	0.52	1.10	0.54	0.78	0.56

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		0.61	0.40	0.71	0.72	1.31	0.75
75-76		0.31	0.24	0.16	0.19	0.25	0.23
MEAN	0.40	0.46	0.32	0.44	0.45	0.78	0.47

GRAND MEAN 0.75

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77/R/CS/161

1ST CUT (4/5/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.176	0.072	0.072	0.088

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.054 0.083*	0.102	0.124	0.124

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.219	0.090	0.090	0.110
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.186			
LIQUID N		0.076		
SPACING			0.076	
N RATE				0.093

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.176	0.127	0.155	0.155
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.107		
LIQUID N.N RATE			0.131	
SPACING.N RATE				0.131

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.219
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.186

* USE ONLY IN TABLES INVOLVING SOLID N

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.176	22.7
BLOCK.WP.SP	17	0.186	24.0

1ST CUT MEAN DM% 19.3

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77/R/CS/161

2ND CUT (31/5/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	3.07	3.06	3.07
UREA+INH	3.19	3.23	3.21
MEAN	3.13	3.15	3.14

N RATE	250	375	500	MEAN
LIQUID N				
UREA	2.73	3.14	3.32	3.07
UREA+INH	2.97	3.09	3.57	3.21
MEAN	2.85	3.12	3.45	3.14

N RATE	250	375	500	MEAN
SPACING				
30 CM	2.89	3.11	3.39	3.13
60 CM	2.82	3.12	3.51	3.15
MEAN	2.85	3.12	3.45	3.14

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	4.04	2.10	3.07
UREA+INH	4.04	2.38	3.21
MEAN	4.04	2.24	3.14

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	4.19	2.07	3.13
60 CM	3.88	2.41	3.15
MEAN	4.04	2.24	3.14

YEARS	75-77	75-76	MEAN
N RATE			
250	3.90	1.81	2.85
375	4.04	2.20	3.12
500	4.18	2.71	3.45
MEAN	4.04	2.24	3.14

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77/R/CS/161

2ND CUT (31/5/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	2.84	3.04	3.34	2.62	3.25	3.31
UREA+INH	2.93	3.19	3.44	3.01	3.00	3.70

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	4.17	1.97	3.90	2.22
UREA+INH	4.22	2.16	3.87	2.60

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	3.85	1.61	4.09	2.20	4.17	2.48
UREA+INH	3.94	2.00	3.98	2.20	4.20	2.94

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	4.04	1.74	4.20	2.02	4.34	2.43
60 CM	3.76	1.87	3.87	2.38	4.03	2.98

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	4.00	1.68	4.17	1.90	4.34	2.33
	60 CM	3.70	1.54	4.01	2.49	3.99	2.64
UREA+INH	30 CM	4.07	1.80	4.24	2.14	4.34	2.54
	60 CM	3.81	2.21	3.73	2.26	4.06	3.33

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		2.28	2.83	3.52	3.65	3.95	3.25
75-76		1.44	1.68	1.72	1.68	1.53	1.61
MEAN	1.09	1.86	2.25	2.62	2.67	2.74	2.21

GRAND MEAN 2.83

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2ND CUT (31/5/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.192	0.078	0.078	0.096

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.057 0.089*	0.111	0.135	0.135

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.238	0.097	0.097	0.119
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.199			
LIQUID N		0.081		
SPACING			0.081	
N RATE				0.100

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.192	0.137	0.168	0.168
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.115		
LIQUID N.N RATE			0.141	
SPACING.N RATE				0.141

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.238
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.199

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.192	6.5
BLOCK.WP.SP	17	0.199	6.8

2ND CUT MEAN DM% 19.8

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3RD CUT (30/6/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	0.82	0.93	0.88
UREA+INH	0.87	0.86	0.87
MEAN	0.84	0.90	0.87

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.83	0.95	0.85	0.88
UREA+INH	0.76	1.00	0.85	0.87
MEAN	0.79	0.97	0.85	0.87

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.70	0.97	0.87	0.84
60 CM	0.88	0.98	0.83	0.90
MEAN	0.79	0.97	0.85	0.87

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	0.85	0.90	0.88
UREA+INH	0.81	0.92	0.87
MEAN	0.83	0.91	0.87

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	0.76	0.93	0.84
60 CM	0.90	0.90	0.90
MEAN	0.83	0.91	0.87

YEARS	75-77	75-76	MEAN
N RATE			
250	0.80	0.78	0.79
375	0.96	0.98	0.97
500	0.73	0.97	0.85
MEAN	0.83	0.91	0.87

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3RD CUT (30/6/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.71	0.94	0.82	0.94	0.96	0.88
UREA+INH	0.69	0.99	0.92	0.83	1.00	0.77

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	0.76	0.88	0.93	0.93
UREA+INH	0.76	0.98	0.86	0.87

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	0.82	0.83	1.00	0.90	0.72	0.98
UREA+INH	0.77	0.74	0.93	1.06	0.73	0.96

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	0.67	0.73	0.95	0.99	0.67	1.07
60 CM	0.93	0.84	0.98	0.98	0.79	0.87

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	0.65	0.77	0.99	0.88	0.65	0.99
	60 CM	1.00	0.88	1.01	0.92	0.79	0.98
UREA+INH	30 CM	0.69	0.69	0.90	1.09	0.69	1.15
	60 CM	0.86	0.80	0.95	1.04	0.78	0.76

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		0.96	1.16	1.24	1.15	0.97	1.10
75-76		0.63	0.67	0.68	0.76	0.86	0.72
MEAN	0.56	0.79	0.91	0.96	0.96	0.91	0.85

GRAND MEAN 0.86

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3RD CUT (30/6/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.119	0.049	0.049	0.059

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.033 0.052*	0.069	0.084	0.084

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.144	0.059	0.059	0.072
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.115			
LIQUID N		0.047		
SPACING			0.047	
N RATE				0.058

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.119	0.083	0.102	0.102
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.067		
LIQUID N.N RATE			0.082	
SPACING.N RATE				0.082

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.144
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.115

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.119	13.5
BLOCK.WP.SP	17	0.115	13.1

3RD CUT MEAN DM% 19.1

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4TH CUT (2/8/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	1.29	1.30	1.30
UREA+INH	1.08	1.37	1.23
MEAN	1.19	1.34	1.26

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.81	1.41	1.67	1.30
UREA+INH	0.80	1.42	1.47	1.23
MEAN	0.80	1.41	1.57	1.26

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.68	1.30	1.58	1.19
60 CM	0.93	1.53	1.55	1.34
MEAN	0.80	1.41	1.57	1.26

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	1.68	0.91	1.30
UREA+INH	1.39	1.06	1.23
MEAN	1.54	0.98	1.26

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	1.45	0.92	1.19
60 CM	1.63	1.04	1.34
MEAN	1.54	0.98	1.26

YEARS	75-77	75-76	MEAN
N RATE			
250	1.01	0.60	0.80
375	1.81	1.02	1.41
500	1.80	1.33	1.57
MEAN	1.54	0.98	1.26

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4TH CUT (2/8/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.67	1.36	1.84	0.95	1.46	1.50
UREA+INH	0.68	1.25	1.33	0.91	1.59	1.61

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	1.68	0.90	1.69	0.91
UREA+INH	1.22	0.95	1.57	1.17

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	1.10	0.53	1.89	0.93	2.07	1.27
UREA+INH	0.92	0.67	1.73	1.11	1.53	1.40

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	0.80	0.56	1.68	0.92	1.87	1.30
60 CM	1.23	0.64	1.93	1.12	1.73	1.37

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	0.82	0.53	1.84	0.88	2.38	1.30
	60 CM	1.39	0.52	1.94	0.99	1.76	1.24
UREA+INH	30 CM	0.78	0.58	1.53	0.97	1.36	1.29
	60 CM	1.07	0.76	1.93	1.25	1.71	1.50

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		0.66	1.00	1.62	1.66	1.87	1.36
75-76		0.40	0.41	0.58	0.70	0.87	0.59
MEAN	0.29	0.53	0.71	1.10	1.18	1.37	0.86

GRAND MEAN 1.13

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4TH CUT (2/8/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.168	0.068	0.068	0.084

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.050 0.078*	0.097	0.119	0.119

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.208	0.085	0.085	0.104
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.174			
LIQUID N		0.071		
SPACING			0.071	
N RATE				0.087

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.168	0.120	0.147	0.147
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.100		
LIQUID N.N RATE			0.123	
SPACING.N RATE				0.123

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.208
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.174

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.168	14.2
BLOCK.WP.SP	17	0.174	14.8

4TH CUT MEAN DM% 25.5

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5TH CUT (5/9/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	0.96	1.04	1.00
UREA+INH	0.94	1.09	1.01
MEAN	0.95	1.07	1.01

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.59	1.06	1.35	1.00
UREA+INH	0.61	1.04	1.39	1.01
MEAN	0.60	1.05	1.37	1.01

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.48	0.99	1.38	0.95
60 CM	0.72	1.12	1.36	1.07
MEAN	0.60	1.05	1.37	1.01

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	1.34	0.66	1.00
UREA+INH	1.36	0.66	1.01
MEAN	1.35	0.66	1.01

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	1.26	0.64	0.95
60 CM	1.45	0.68	1.07
MEAN	1.35	0.66	1.01

YEARS	75-77	75-76	MEAN
N RATE			
250	0.77	0.43	0.60
375	1.43	0.67	1.05
500	1.86	0.88	1.37
MEAN	1.35	0.66	1.01

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5TH CUT (5/9/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.50	0.99	1.38	0.68	1.13	1.32
UREA+INH	0.45	0.98	1.38	0.76	1.10	1.40

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	1.27	0.64	1.42	0.67
UREA+INH	1.25	0.63	1.48	0.69

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	0.74	0.44	1.42	0.71	1.87	0.83
UREA+INH	0.79	0.42	1.44	0.64	1.86	0.92

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	0.56	0.39	1.32	0.66	1.90	0.86
60 CM	0.97	0.47	1.55	0.69	1.83	0.89

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	0.54	0.46	1.38	0.61	1.89	0.86
	60 CM	0.94	0.42	1.46	0.80	1.85	0.80
UREA+INH	30 CM	0.59	0.32	1.25	0.71	1.91	0.86
	60 CM	1.00	0.52	1.63	0.58	1.81	0.98

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		0.86	1.32	1.69	1.98	1.90	1.55
75-76		0.20	0.36	0.49	0.55	0.68	0.45
MEAN	0.24	0.53	0.84	1.09	1.27	1.29	0.87

GRAND MEAN 0.96

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5TH CUT (5/9/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.125	0.051	0.051	0.062

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.053 0.083*	0.072	0.088	0.088

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.180	0.074	0.074	0.090
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.185			
LIQUID N		0.075		
SPACING			0.075	
N RATE				0.092

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.125	0.104	0.128	0.128
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.107		
LIQUID N.N RATE			0.131	
SPACING.N RATE				0.131

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.180
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.185

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.125	12.4
BLOCK.WP.SP	17	0.185	18.4

5TH CUT MEAN DM% 20.3

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6TH CUT (8/11/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	1.04	1.38	1.21
UREA+INH	1.06	1.27	1.17
MEAN	1.05	1.33	1.19

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.80	1.34	1.48	1.21
UREA+INH	0.59	1.26	1.65	1.17
MEAN	0.70	1.30	1.57	1.19

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.64	1.04	1.48	1.05
60 CM	0.75	1.57	1.65	1.33
MEAN	0.70	1.30	1.57	1.19

YEARS	75-77	75-76	MEAN
LIQUID N			
UREA	1.49	0.93	1.21
UREA+INH	1.46	0.87	1.17
MEAN	1.48	0.90	1.19

YEARS	75-77	75-76	MEAN
SPACING			
30 CM	1.26	0.84	1.05
60 CM	1.69	0.96	1.33
MEAN	1.48	0.90	1.19

YEARS	75-77	75-76	MEAN
N RATE			
250	0.82	0.57	0.70
375	1.64	0.96	1.30
500	1.96	1.17	1.57
MEAN	1.48	0.90	1.19

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77/R/CS/161

6TH CUT (8/11/77) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.70	1.04	1.39	0.90	1.64	1.58
UREA+INH	0.57	1.03	1.57	0.61	1.49	1.73

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	1.22	0.87	1.76	0.99
UREA+INH	1.30	0.82	1.62	0.93

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	0.92	0.68	1.67	1.02	1.89	1.08
UREA+INH	0.73	0.45	1.62	0.90	2.04	1.26

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	0.71	0.56	1.28	0.79	1.79	1.17
60 CM	0.93	0.57	2.01	1.13	2.13	1.18

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	0.79	0.61	1.21	0.87	1.67	1.11
	60 CM	1.05	0.76	2.13	1.16	2.11	1.05
UREA+INH	30 CM	0.63	0.51	1.35	0.71	1.91	1.22
	60 CM	0.82	0.39	1.89	1.09	2.16	1.30

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		0.91	1.64	1.67	2.03	2.20	1.69
75-76		0.44	0.36	0.37	0.82	0.92	0.58
MEAN	0.40	0.68	1.00	1.02	1.42	1.56	1.01

GRAND MEAN 1.13

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77/R/CS/161

6TH CUT (8/11/77) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.245	0.100	0.100	0.123

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.065 0.101*	0.142	0.173	0.173

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.293	0.120	0.120	0.146
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.065			
LIQUID N		0.092		
SPACING			0.092	
N RATE				0.113

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.245	0.169	0.207	0.207
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.131		
LIQUID N.N RATE			0.160	
SPACING.N RATE				0.160

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.293
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.226

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.245	20.9
BLOCK.WP.SP	17	0.226	19.3

6TH CUT MEAN DM% 22.5

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TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

SPACING LIQUID N	30 CM	60 CM	MEAN
UREA	8.11	8.67	8.39
UREA+INH	8.07	8.59	8.33
MEAN	8.09	8.63	8.36

N RATE LIQUID N	250	375	500	MEAN
UREA	6.71	8.87	9.59	8.39
UREA+INH	6.61	8.63	9.74	8.33
MEAN	6.66	8.75	9.66	8.36

N RATE SPACING	250	375	500	MEAN
30 CM	6.33	8.30	9.63	8.09
60 CM	6.99	9.20	9.70	8.63
MEAN	6.66	8.75	9.66	8.36

YEARS LIQUID N	75-77	75-76	MEAN
UREA	10.82	5.96	8.39
UREA+INH	10.32	6.33	8.33
MEAN	10.57	6.15	8.36

YEARS SPACING	75-77	75-76	MEAN
30 CM	10.43	5.74	8.09
60 CM	10.70	6.55	8.63
MEAN	10.57	6.15	8.36

YEARS N RATE	75-77	75-76	MEAN
250	8.73	4.59	6.66
375	11.19	6.31	8.75
500	11.79	7.54	9.66
MEAN	10.57	6.15	8.36

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TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	6.33	8.34	9.65	7.09	9.41	9.52
UREA+INH	6.33	8.26	9.62	6.89	9.00	9.87

SPACING	30 CM		60 CM	
YEARS	75-77	75-76	75-77	75-76
LIQUID N				
UREA	10.61	5.61	11.03	6.32
UREA+INH	10.26	5.87	10.38	6.79

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N						
UREA	8.94	4.47	11.45	6.30	12.06	7.11
UREA+INH	8.52	4.70	10.92	6.33	11.52	7.97

N RATE	250		375		500	
YEARS	75-77	75-76	75-77	75-76	75-77	75-76
SPACING						
30 CM	8.38	4.28	10.86	5.73	12.06	7.20
60 CM	9.09	4.89	11.51	6.89	11.51	7.88

	N RATE	250		375		500	
	YEARS	75-77	75-76	75-77	75-76	75-77	75-76
LIQUID N	SPACING						
UREA	30 CM	8.31	4.34	11.11	5.57	12.39	6.91
	60 CM	9.58	4.60	11.79	7.03	11.73	7.32
UREA+INH	30 CM	8.44	4.22	10.61	5.90	11.74	7.50
	60 CM	8.60	5.19	11.23	6.76	11.30	8.44

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75-77		6.28	8.36	10.46	11.20	12.21	9.70
75-76		3.41	3.71	4.00	4.69	5.10	4.18
MEAN	2.98	4.85	6.04	7.23	7.95	8.66	6.28

GRAND MEAN 7.67

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TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.538	0.220	0.220	0.269

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.107 0.166*	0.311	0.380	0.380

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.599	0.244	0.244	0.299
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.372			
LIQUID N		0.152		
SPACING			0.152	
N RATE				0.186

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.538	0.346	0.423	0.423
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.215		
LIQUID N.N RATE			0.263	
SPACING.N RATE				0.263

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.599
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.372

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.538	6.8
BLOCK.WP.SP	17	0.372	4.7

TOTAL OF 6 CUTS MEAN DM% 21.1

SUB PLOT AREA HARVESTED 0.00141

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77/R/CS/162

TIMES OF APPLYING ACARICIDE

Object: To study the effects of times of applying the acaricide endosulfan, on the incidence of ryegrass mosaic virus and its mite vectors and on the yield of ryegrass - Claycroft.

Sponsors: R.W. Gibson, R.T. Plumb.

The third year, ryegrass.

For previous years see 75-76/R/CS/162.

Design: Originally 4 randomised blocks of 18 plots - 9 plots Italian ryegrass and 9 plots perennial ryegrass. In 1977 yields were taken only from plots sown to Italian ryegrass. Design: 4 randomised blocks of 9 plots with CULTIVTN on blocks.

Whole plot dimensions: 4.27 x 6.10.

Treatments: All combinations of:-

Blocks

1. CULTIVTN — Cultivations to existing, failing, sward before resowing Italian ryegrass (S22) in autumn 1976:

   NONE — Seed sown into undisturbed sward, heavy spring-tine in and rolled

   MANY — Sward destroyed before sowing by many cultivations, seed sown, harrowed in and rolled

Plots

2. ACA TIME(757) Times of applying endosulfan 1975-1977

	1975	1976	1977
- - -	Never	Never	Never
- JN JL	Never	June	July (duplicated)
JL JL JL	July	July	July
SE AU -	September	August	Never
OC - -	October	Never	Never
OC NO -	October	November	Never
ALL	July-October	June-November	July
POST-CUT	July	June-November	July

NOTE: Endosulfan was applied at 0.35 kg in 430 l on 21 July, 1977.

Basal applications: Manures: (25:0:16) at 800 kg in spring, at 600 kg after each of the first two cuts.

Seed: S.22, sown at 36 kg.

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77/R/CS/162

Cultivations, etc.:-
All blocks: NK applied: 4 Mar, 1977, 1 June, 26 July. Cut three times: 25 May, 14 July, 24 Nov.
CULTIVTN NONE blocks only: Seed sown, heavy spring-tine cultivated twice: 21 Sept, 1976. Rolled: 22 Sept.
CULTIVTN MANY blocks only: Deep-tine cultivated twice, heavy spring-tine cultivated: 14 Sept, 1976. Rotary cultivated, spring-tine cultivated, harrowed: 20 Sept. Sown, harrowed: 21 Sept.

NOTE: Mites were counted and virus scores made at intervals during the season.

1ST CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN ACA TIME(757)	NONE	MANY	MEAN
- - -	5.32	4.74	5.03
- JN JL	5.49	5.06	5.28
JL JL JL	5.09	4.59	4.84
SE AU -	5.10	4.27	4.68
OC - -	5.38	4.50	4.94
OC NO -	5.59	4.97	5.28
ALL	5.74	5.00	5.37
POST-CUT	5.44	5.18	5.31
MEAN	5.40	4.82	5.11

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

TABLE	ACA TIME(757)	CULTIVTN* ACA TIME(757)	
SED	0.292	0.413	MIN REP
	0.253	0.358	MAX-MIN

* WITHIN SAME LEVEL OF CULTIVTN ONLY

	ACA TIME
MAX-MIN	- JN JL V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.413	8.1

1ST CUT MEAN DM% 15.2

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77/R/CS/162

2ND CUT (14/7/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN ACA TIME(757)	NONE	MANY	MEAN
- - -	4.91	4.78	4.84
- JN JL	4.94	5.20	5.07
JL JL JL	4.71	5.00	4.86
SE AU -	4.58	5.14	4.86
OC - -	5.07	4.79	4.93
OC NO -	4.70	4.60	4.65
ALL	4.47	5.28	4.88
POST-CUT	4.68	4.98	4.83
MEAN	4.78	5.00	4.89

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

TABLE	ACA TIME(757)	CULTIVTN* ACA TIME(757)	
SED	0.267	0.378	MIN REP
	0.231	0.327	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.378	7.7

2ND CUT MEAN DM% 19.5

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3RD CUT (24/11/77) DRY MATTER TONNES/HECTARE

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

CULTIVTN ACA TIME(757)	NONE	MANY	MEAN
- - -	3.62	3.74	3.68
- JN JL	3.67	3.86	3.76
JL JL JL	3.77	3.96	3.86
SE AU -	3.50	3.36	3.43
OC - -	4.23	3.70	3.97
OC NO -	3.58	4.07	3.83
ALL	3.64	4.16	3.90
POST-CUT	3.80	3.98	3.89
MEAN	3.72	3.85	3.79

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

TABLE	ACA TIME(757)	CULTIVTN* ACA TIME(757)	
SED	0.371	0.524	MIN REP
	0.321	0.454	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.524	13.8

3RD CUT MEAN DM% 19.9

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TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CULTIVTN ACA TIME(757)	NONE	MANY	MEAN
- - -	13.84	13.26	13.55
- JN JL	14.10	14.12	14.11
JL JL JL	13.57	13.55	13.56
SE AU -	13.17	12.77	12.97
OC - -	14.68	12.99	13.84
OC NO -	13.88	13.64	13.76
ALL	13.85	14.45	14.15
POST-CUT	13.93	14.13	14.03
MEAN	13.90	13.67	13.79

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

TABLE	ACA TIME(757)	CULTIVTN* ACA TIME(757)	
SED	0.617	0.873	MIN REP
	0.534	0.756	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.873	6.3

TOTAL OF 3 CUTS MEAN DM% 18.2

PLOT AREA HARVESTED 0.00062

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77/W/CS/174

SOWING DATES AND CCN

Object: To study the residual effects of sowing date and the effect of a nematicide and a soil sterilant on the incidence of cereal cyst-nematode (Heterodera avenae) (CCN) and the yield of three cereals in a soil known to contain a fungal parasite of the nematode - Woburn, Butt Close.

Sponsor: B.R. Kerry.

The third year, spring wheat, barley and oats.

For previous years see 75/W/M/1 and 76/W/CS/174.

Design: Single replicate of 36 plots split into 2.

Whole plot dimensions: 2.13 x 6.70.

Treatments: All combinations of:-

Whole plots

1. CROP(76) Crop (cumulative 1975-76):

   WHEAT
   BARLEY
   OATS

2. SOW DATE(76) Sowing date (cumulative 1975-76):

   AUTUMN
   SPRING

3. NEMACIDE(77) Nematicide (cumulative 1975-77):

   NONE None
   OXAMYL Oxamyl at 8.8 kg

4. CROP(77) Crop in 1977, (all spring sown):

   WHEAT
   BARLEY
   OATS

Sub plots

5. STERILNT Sterilant

   NONE None
   FORMALIN Formalin at 3000 l in 109000 l. To SOW DATE SPRING in 1976 only. To SOW DATE AUTUMN in 1977 only.

Basal applications: Manures: (20:14:14) at 380 kg combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 280 l and later at 1.12 kg ion in 560 l. Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 340 l, 2, 4-D at 0.56 kg plus dichlorprop at 2.2 kg in 340 l.

Seed: Wheat: Sappo, sown at 190 kg.
Barley: Julia, sown at 160 kg.
Oats: Manod, sown at 200 kg.

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Cultivations, etc.:- All cereals: First paraquat applied: 10 Aug, 1976. Second paraquat applied: 11 Oct. Ploughed: 15 Nov. Spring-tine cultivated with crumbler attached: 15 Feb, 1977. Formalin applied: 16 Feb. Oxamyl applied and these plots only rotary cultivated then all plots spring-tine cultivated with crumbler attached, seed sown: 30 Mar. Ioxynil with mecoprop applied: 18 May. 2, 4-D with dichlorprop applied: 2 June. Combine harvested: 5 Sept.

NOTES: (1) Soil samples were taken in February for estimates of Heterodera avenae cysts and eggs.
(2) Soil and plant samples were taken from plots not treated with oxamyl at weekly intervals from 8 June to 22 August for estimates of numbers of females and eggs of H. avenae and the amount of fungal parasitism of these stages.
(3) Soil samples were taken on 7 Sept for population counts in plots not treated with oxamyl and from all plots a month later.

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77/W/CS/174

GRAIN TONNES/HECTARE

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

SOW DATE(76) / CROP(76)	AUTUMN	SPRING	MEAN
WHEAT	2.82	2.68	2.75
BARLEY	2.64	2.94	2.79
OATS	2.23	2.62	2.43
MEAN	2.57	2.75	2.66

NEMACIDE(77) / CROP(76)	NONE	OXAMYL	MEAN
WHEAT	1.82	3.69	2.75
BARLEY	1.73	3.86	2.79
OATS	1.62	3.24	2.43
MEAN	1.72	3.60	2.66

NEMACIDE(77) / SOW DATE(76)	NONE	OXAMYL	MEAN
AUTUMN	1.69	3.44	2.57
SPRING	1.75	3.75	2.75
MEAN	1.72	3.60	2.66

CROP(77) / CROP(76)	WHEAT	BARLEY	OATS	MEAN
WHEAT	2.82	3.37	2.07	2.75
BARLEY	2.56	3.73	2.09	2.79
OATS	2.24	3.24	1.80	2.43
MEAN	2.54	3.45	1.99	2.66

CROP(77) / SOW DATE(76)	WHEAT	BARLEY	OATS	MEAN
AUTUMN	2.37	3.33	2.00	2.57
SPRING	2.70	3.56	1.98	2.75
MEAN	2.54	3.45	1.99	2.66

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77/W/CS/174

GRAIN TONNES/HECTARE

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

CROP(77) / NEMACIDE(77)	WHEAT	BARLEY	OATS	MEAN
NONE	1.65	2.37	1.14	1.72
OXAMYL	3.43	4.52	2.84	3.60
MEAN	2.54	3.45	1.99	2.66

STERILNT / CROP(76)	NONE	FORMALIN	MEAN
WHEAT	2.75	2.76	2.75
BARLEY	2.72	2.87	2.79
OATS	2.22	2.64	2.43
MEAN	2.56	2.75	2.66

STERILNT / SOW DATE(76)	NONE	FORMALIN	MEAN
AUTUMN	2.43	2.70	2.57
SPRING	2.69	2.81	2.75
MEAN	2.56	2.75	2.66

STERILNT / NEMACIDE(77)	NONE	FORMALIN	MEAN
NONE	1.60	1.84	1.72
OXAMYL	3.52	3.67	3.60
MEAN	2.56	2.75	2.66

STERILNT / CROP(77)	NONE	FORMALIN	MEAN
WHEAT	2.46	2.62	2.54
BARLEY	3.25	3.65	3.45
OATS	1.97	2.00	1.99
MEAN	2.56	2.75	2.66

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(77) / CROP(76)	NONE	OXAMYL	NONE	OXAMYL
WHEAT	1.88	3.77	1.75	3.61
BARLEY	1.70	3.58	1.75	4.13
OATS	1.48	2.98	1.75	3.49

SOW DATE(76)	AUTUMN			SPRING		
CROP(77) / CROP(76)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
WHEAT	2.84	3.36	2.26	2.80	3.38	1.87
BARLEY	2.29	3.63	2.01	2.82	3.83	2.17
OATS	1.99	2.99	1.72	2.49	3.48	1.89

NEMACIDE(77)	NONE			OXAMYL		
CROP(77) / CROP(76)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
WHEAT	1.87	2.35	1.22	3.77	4.39	2.91
BARLEY	1.66	2.22	1.30	3.45	5.24	2.88
OATS	1.41	2.55	0.89	3.07	3.93	2.72

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GRAIN TONNES/HECTARE

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

NEMACIDE(77)	NONE			OXAMYL		
CROP(77)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	1.73	2.19	1.14	3.02	4.47	2.85
SPRING	1.56	2.55	1.13	3.85	4.57	2.82

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.60	3.04	2.89	2.48
BARLEY	2.62	2.67	2.82	3.07
OATS	2.08	2.39	2.36	2.88

NEMACIDE(77)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	1.79	1.84	3.70	3.68
BARLEY	1.62	1.83	3.81	3.91
OATS	1.39	1.84	3.04	3.44

NEMACIDE(77)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	1.47	1.91	3.39	3.50
SPRING	1.73	1.76	3.64	3.85

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	2.80	2.84	3.43	3.31	2.01	2.12
BARLEY	2.44	2.68	3.47	3.99	2.24	1.94
OATS	2.14	2.34	2.84	3.64	1.67	1.93

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	2.16	2.58	3.14	3.52	1.99	2.00
SPRING	2.75	2.65	3.35	3.77	1.96	2.00

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(77)						
NONE	1.52	1.77	2.24	2.51	1.05	1.23
OXAMYL	3.39	3.47	4.26	4.78	2.90	2.77

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

TABLE	CROP(76)	SOW DATE(76)	NEMACIDE(77)	CROP(77)
SED	0.213	0.174	0.174	0.213

TABLE	STERILNT	CROP(76) SOW DATE(76)	CROP(76) NEMACIDE(77)	SOW DATE(76) NEMACIDE(77)
SED	0.089	0.302	0.302	0.246

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77/W/CS/174

GRAIN TONNES/HECTARE

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

TABLE	CROP(76) CROP(77)	SOW DATE(76) CROP(77)	NEMACIDE(77) CROP(77)	CROP(76) STERILNT
SED	0.370	0.302	0.302	0.240
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76)				0.155

TABLE	SOW DATE(76) STERILNT	NEMACIDE(77) STERILNT	CROP(77) STERILNT	CROP(76) SOW DATE(76) NEMACIDE(77)
SED	0.196	0.196	0.240	0.427
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOW DATE(76)	0.127			
NEMACIDE(77)		0.127		
CROP(77)			0.155	

TABLE	CROP(76) SOW DATE(76) CROP(77)	CROP(76) NEMACIDE(77) CROP(77)	SOW DATE(76) NEMACIDE(77) CROP(77)	CROP(76) SOW DATE(76) STERILNT
SED	0.523	0.523	0.427	0.339
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).SOW DATE(76)				0.219

TABLE	CROP(76) NEMACIDE(77) STERILNT	SOW DATE(76) NEMACIDE(77) STERILNT	CROP(76) CROP(77) STERILNT	SOW DATE(76) CROP(77) STERILNT
SED	0.339	0.277	0.416	0.339
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).NEMACIDE(77)	0.219			
SOW DATE(76).NEMACIDE(77)		0.179		
CROP(76).CROP(77)			0.268	
SOW DATE(76).CROP(77)				0.219

TABLE	NEMACIDE(77) CROP(77) STERILNT
SED	0.339
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
NEMACIDE(77).CROP(77)	

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

STRATUM	DF	SE	CV%
WP	4	0.523	19.7
WP.SP	16	0.380	14.3

GRAIN MEAN DM% 82.9

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STRAW TONNES/HECTARE

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

SOW DATE(76)	AUTUMN	SPRING	MEAN
CROP(76)			
WHEAT	2.46	2.21	2.34
BARLEY	2.32	2.21	2.27
OATS	1.94	2.16	2.05
MEAN	2.24	2.20	2.22

NEMACIDE(77)	NONE	OXAMYL	MEAN
CROP(76)			
WHEAT	1.64	3.03	2.34
BARLEY	1.59	2.94	2.27
OATS	1.43	2.66	2.05
MEAN	1.56	2.88	2.22

NEMACIDE(77)	NONE	OXAMYL	MEAN
SOW DATE(76)			
AUTUMN	1.59	2.88	2.24
SPRING	1.52	2.87	2.20
MEAN	1.56	2.88	2.22

CROP(77)	WHEAT	BARLEY	OATS	MEAN
CROP(76)				
WHEAT	2.62	1.90	2.48	2.34
BARLEY	2.55	1.95	2.29	2.27
OATS	2.17	1.87	2.10	2.05
MEAN	2.45	1.91	2.29	2.22

CROP(77)	WHEAT	BARLEY	OATS	MEAN
SOW DATE(76)				
AUTUMN	2.55	1.86	2.31	2.24
SPRING	2.35	1.96	2.27	2.20
MEAN	2.45	1.91	2.29	2.22

CROP(77)	WHEAT	BARLEY	OATS	MEAN
NEMACIDE(77)				
NONE	1.74	1.39	1.53	1.56
OXAMYL	3.15	2.43	3.05	2.88
MEAN	2.45	1.91	2.29	2.22

STERILNT	NONE	FORMALIN	MEAN
CROP(76)			
WHEAT	2.32	2.35	2.34
BARLEY	2.19	2.34	2.27
OATS	1.95	2.15	2.05
MEAN	2.15	2.28	2.22

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STRAW TONNES/HECTARE

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

STERILNT SOW DATE(76)	NONE	FORMALIN	MEAN
AUTUMN	2.15	2.33	2.24
SPRING	2.16	2.23	2.20
MEAN	2.15	2.28	2.22

STERILNT NEMACIDE(77)	NONE	FORMALIN	MEAN
NONE	1.44	1.67	1.56
OXAMYL	2.87	2.89	2.88
MEAN	2.15	2.28	2.22

STERILNT CROP(77)	NONE	FORMALIN	MEAN
WHEAT	2.28	2.62	2.45
BARLEY	1.88	1.94	1.91
OATS	2.31	2.27	2.29
MEAN	2.15	2.28	2.22

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(77)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	1.76	3.16	1.51	2.91
BARLEY	1.69	2.95	1.50	2.93
OATS	1.33	2.54	1.54	2.79

SOW DATE(76)	AUTUMN			SPRING		
CROP(77)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	2.81	1.92	2.65	2.43	1.89	2.31
BARLEY	2.77	1.90	2.29	2.34	2.00	2.30
OATS	2.06	1.75	1.99	2.28	2.00	2.21

NEMACIDE(77)	NONE			OXAMYL		
CROP(77)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	1.78	1.39	1.74	3.46	2.41	3.22
BARLEY	1.92	1.28	1.57	3.19	2.62	3.01
OATS	1.53	1.50	1.28	2.81	2.25	2.92

NEMACIDE(77)	NONE			OXAMYL		
CROP(77)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	1.91	1.32	1.56	3.19	2.40	3.06
SPRING	1.58	1.47	1.50	3.12	2.46	3.04

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.27	2.65	2.37	2.05
BARLEY	2.27	2.37	2.11	2.32
OATS	1.89	1.98	2.01	2.32

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STRAW TONNES/HECTARE

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

NEMACIDE(77)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	1.55	1.73	3.10	2.96
BARLEY	1.47	1.72	2.92	2.96
OATS	1.32	1.55	2.58	2.74

NEMACIDE(77)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	1.47	1.72	2.82	2.94
SPRING	1.42	1.62	2.91	2.84

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	2.52	2.72	1.99	1.81	2.45	2.51
BARLEY	2.20	2.91	1.82	2.08	2.56	2.03
OATS	2.11	2.23	1.81	1.93	1.92	2.28

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	2.27	2.82	1.84	1.87	2.33	2.30
SPRING	2.29	2.41	1.91	2.02	2.29	2.25

CROP(77)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(77)						
NONE	1.52	1.97	1.39	1.39	1.42	1.65
OXAMYL	3.04	3.27	2.36	2.50	3.20	2.90

STRAW MEAN DM% 81.0

PLOT AREA HARVESTED 0.00041

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77/R/CS/176

STEM-EELWORM CONTROL

Object: To study the effects of dates of sowing and of rates and times of applying aldicarb on control of stem-eelworm (Ditylenchus dipsaci) and on the yield of winter onions - Great Field II.

Sponsor: A.G. Whitehead.

The third year, winter onions.

For previous years see 75/R/ON/1 and 76/R/CS/176.

Design: 3 randomised blocks of 10 plots with SOW DATE on blocks.

Whole plot dimensions: 1.22 x 5.18.

Treatments: All combinations of:-

Blocks

1. SOW DATE	Dates of sowing (uniform in two previous years):	
	2 AUG	2 August, 1976
	18 AUG	18 August
	2 SEPT	2 September

Plots

2. ALDICARB	Aldicarb (kg) (cumulative to 1975 and 1976 except as stated):	
	0	None (duplicated)
	1 + 1	1 in seedbed, 1 in spring
	2	2 in seedbed, none in spring
	2 + 2	2 in seedbed, 2 in spring
	4	4 in seedbed, none in spring
	4 + 4	4 in seedbed, 4 in spring
	8	8 in seedbed, none in spring
	(4S) 0	4 in seedbed in 1975 to spring-sown onions, none to winter onions 1976 and 1977 (duplicated)

NOTE: Spring aldicarb applied on 13 Apr, 1977.

Basal applications: Manures: (13:13:20) at 1040 kg. 'Nitro-Chalk' at 450 kg in winter. 'Nitro-Chalk' at 250 kg in spring. Irrigation: 36 mm to first sowing, 18 mm to second sowing.

Seed: Imai Early Yellow, sown at 6.7 kg.

Cultivations, etc.:- Deep-tine cultivated, rotary cultivated, NPK applied, rotary cultivated, rolled and hand raked for first sowing: 2 Aug, 1976. These plots irrigated with 9 mm on each of four occasions: 3 Aug, 10 Aug, 16 Aug, 24 Aug. Deep-tine cultivated, rotary cultivated, NPK applied, rotary cultivated, rolled and hand raked for second sowing: 18 Aug. These plots irrigated with 9 mm on each of two occasions: 19 Aug, 24 Aug. Deep-tine cultivated, rotary cultivated, NPK applied, rotary cultivated, rolled and hand raked for third sowing: 2 Sept. Winter N applied: 4 Jan, 1977. Spring N applied: 8 Mar. Lifted: 21 July.

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NOTES: (1) Plots were hand weeded.
(2) Soil samples were taken for counts of Ditylenchus dipsaci.
(3) Because of the wide discrepancies in yield, means for plots receiving and not receiving aldicarb in spring are presented separately.

SALEABLE ONIONS TONNES/HECTARE

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

ALDICARB APPLIED IN SPRING

SOW DATE ALDICARB	2 AUG	18 AUG	2 SEPT	MEAN
1+1	51.0	42.4	31.3	41.6
2+2	41.8	44.3	33.9	40.0
4+4	32.6	43.7	25.6	34.0
MEAN	41.8	43.5	30.3	38.5

ALDICARB NOT APPLIED IN SPRING

SOW DATE ALDICARB	2 AUG	18 AUG	2 SEPT	MEAN
0	18.0	13.8	6.6	12.8
2	4.4	2.8	0.0	2.4
4	10.8	4.7	16.1	10.6
8	9.2	12.0	11.1	10.8
(4S)0	8.1	0.2	0.8	3.0
MEAN	10.9	6.8	6.0	7.9

PLOT AREA HARVESTED 0.00032

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77/R/CS/180

FACTORS AFFECTING YIELD

Object: To study the residual effects on wheat of a range of treatments applied to field beans in 1976 - Little Hoos.

Sponsors: R. Bardner, K.E. Fletcher, G.G. Briggs, A.J. Cockbain, J.M. Day, B.J. Le J. McEwen, G.A. Salt, H.R. Simpson, R.M. Webb, J.F. Witty.

The second year, winter wheat.

For previous year see 76/R/CS/180.

Design: Single replicate of 2 x 2 x 2 x 2 x 2 x 2 x 2 in eight blocks of 2 plots split into 8.

Whole plot dimensions: 9.14 x 40.2.

Treatments applied in 1976: All combinations of:-

Whole plots

1. IRRIGTN(76) Irrigation:

NONE	None
FULL	Full (291 mm)

Sub plots

2. N(76) Nitrogen fertiliser:

0	0
150+150	150 kg N to seedbed and 150 kg N at flowering

3. ALDICARB(76) Aldicarb to seedbed (kg):

0
10

4. DIELDRIN(76) Dieldrin to seedbed (kg):

0.0
2.5

5. BENOMYL(76) Benomyl to seedbed (kg):

0
15

6. FENITROT(76) Fenitrothion foliar spray (kg):

0.0
1.5

7. PIRIMICA(76) Pirimicarb foliar spray (kg):

0.00
0.14

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Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 400 kg. Weedkiller: Mecoprop ('M.A.C. CMPP' at 4.2 l in 220 l). Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Atou, sown at 190 kg.

Cultivations, etc.:- Ploughed: 23 Aug, 1976. Spring-tine cultivated: 21 Sept, 3 Nov. Seed sown, spring-tine cultivated: 4 Nov. N applied: 19 Apr, 1977. Weedkiller applied: 2 May. Insecticide applied: 15 July. Combine harvested: 10 Sept.

ERRATUM TO 'YIELDS' 1976 p 224

76/R/CS/180. Whole plot dimensions should read "41.0 x 13.7". Those given were the sub plot dimensions.

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GRAIN TONNES/HECTARE

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

BENOMYL(76)	0	15	MEAN
IRRIGTN(76)			
NONE	6.80	6.68	6.74
FULL	6.93	6.80	6.86
MEAN	6.86	6.74	6.80

N(76)	0	150+150	MEAN
IRRIGTN(76)			
NONE	6.73	6.75	6.74
FULL	6.78	6.95	6.86
MEAN	6.75	6.85	6.80

N(76)	0	150+150	MEAN
BENOMYL(76)			
0	6.82	6.91	6.86
15	6.69	6.78	6.74
MEAN	6.75	6.85	6.80

DIELDRIN(76)	0.0	2.5	MEAN
IRRIGTN(76)			
NONE	6.80	6.68	6.74
FULL	6.87	6.85	6.86
MEAN	6.83	6.77	6.80

DIELDRIN(76)	0.0	2.5	MEAN
BENOMYL(76)			
0	6.92	6.81	6.86
15	6.75	6.73	6.74
MEAN	6.83	6.77	6.80

DIELDRIN(76)	0.0	2.5	MEAN
N(76)			
0	6.78	6.73	6.75
150+150	6.89	6.80	6.85
MEAN	6.83	6.77	6.80

FENITROT(76)	0.0	1.5	MEAN
IRRIGTN(76)			
NONE	6.76	6.71	6.74
FULL	6.82	6.91	6.86
MEAN	6.79	6.81	6.80

FENITROT(76)	0.0	1.5	MEAN
BENOMYL(76)			
0	6.84	6.89	6.86
15	6.74	6.73	6.74
MEAN	6.79	6.81	6.80

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GRAIN TONNES/HECTARE

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

FENITROT(76)	0.0	1.5	MEAN
N(76)			
0	6.78	6.73	6.75
150+150	6.80	6.89	6.85
MEAN	6.79	6.81	6.80

FENITROT(76)	0.0	1.5	MEAN
DIELDRIN(76)			
0.0	6.85	6.81	6.83
2.5	6.73	6.80	6.77
MEAN	6.79	6.81	6.80

PIRIMICA(76)	0.00	0.14	MEAN
IRRIGTN(76)			
NONE	6.71	6.77	6.74
FULL	6.89	6.84	6.86
MEAN	6.80	6.80	6.80

PIRIMICA(76)	0.00	0.14	MEAN
BENOMYL(76)			
0	6.87	6.85	6.86
15	6.72	6.75	6.74
MEAN	6.80	6.80	6.80

PIRIMICA(76)	0.00	0.14	MEAN
N(76)			
0	6.72	6.79	6.75
150+150	6.87	6.82	6.85
MEAN	6.80	6.80	6.80

PIRIMICA(76)	0.00	0.14	MEAN
DIELDRIN(76)			
0.0	6.79	6.88	6.83
2.5	6.80	6.73	6.77
MEAN	6.80	6.80	6.80

PIRIMICA(76)	0.00	0.14	MEAN
FENITROT(76)			
0.0	6.79	6.79	6.79
1.5	6.80	6.81	6.81
MEAN	6.80	6.80	6.80

ALDICARB(76)	0	10	MEAN
IRRIGTN(76)			
NONE	6.77	6.70	6.74
FULL	7.01	6.72	6.86
MEAN	6.89	6.71	6.80

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GRAIN TONNES/HECTARE

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

ALDICARB(76) BENOMYL(76)	0	10	MEAN
0	6.93	6.80	6.86
15	6.86	6.62	6.74
MEAN	6.89	6.71	6.80

ALDICARB(76) N(76)	0	10	MEAN
0	6.86	6.65	6.75
150+150	6.92	6.77	6.85
MEAN	6.89	6.71	6.80

ALDICARB(76) DIELDRIN(76)	0	10	MEAN
0.0	6.95	6.72	6.83
2.5	6.83	6.70	6.77
MEAN	6.89	6.71	6.80

ALDICARB(76) FENITROT(76)	0	10	MEAN
0.0	6.90	6.69	6.79
1.5	6.89	6.73	6.81
MEAN	6.89	6.71	6.80

ALDICARB(76) PIRIMICA(76)	0	10	MEAN
0.00	6.87	6.72	6.80
0.14	6.91	6.70	6.80
MEAN	6.89	6.71	6.80

N(76)	0		150+150	
ALDICARB(76)	0	10	0	10
IRRIGTN(76)				
NONE	6.83	6.63	6.71	6.78
FULL	6.89	6.67	7.13	6.76

N(76)	0		150+150	
DIELDRIN(76)	0.0	2.5	0.0	2.5
IRRIGTN(76)				
NONE	6.76	6.70	6.84	6.65
FULL	6.80	6.76	6.94	6.95

ALDICARB(76)	0		10	
DIELDRIN(76)	0.0	2.5	0.0	2.5
IRRIGTN(76)				
NONE	6.87	6.68	6.73	6.68
FULL	7.03	6.99	6.72	6.72

ALDICARB(76)	0		10	
DIELDRIN(76)	0.0	2.5	0.0	2.5
N(76)				
0	6.88	6.84	6.68	6.62
150+150	7.02	6.83	6.76	6.78

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GRAIN TONNES/HECTARE

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

N(76)	0		150+150	
BENOMYL(76)	0	15	0	15
IRRIGTN(76)				
NONE	6.79	6.66	6.80	6.69
FULL	6.85	6.71	7.01	6.88

ALDICARB(76)	0		10	
BENOMYL(76)	0	15	0	15
IRRIGTN(76)				
NONE	6.80	6.74	6.79	6.61
FULL	7.05	6.97	6.81	6.62

ALDICARB(76)	0		10	
BENOMYL(76)	0	15	0	15
N(76)				
0	6.89	6.83	6.75	6.55
150+150	6.96	6.89	6.85	6.68

DIELDRIN(76)	0.0		2.5	
BENOMYL(76)	0	15	0	15
IRRIGTN(76)				
NONE	6.89	6.70	6.70	6.65
FULL	6.95	6.79	6.91	6.80

DIELDRIN(76)	0.0		2.5	
BENOMYL(76)	0	15	0	15
N(76)				
0	6.84	6.72	6.81	6.65
150+150	7.01	6.77	6.81	6.80

DIELDRIN(76)	0.0		2.5	
BENOMYL(76)	0	15	0	15
ALDICARB(76)				
0	7.04	6.85	6.81	6.86
10	6.80	6.64	6.80	6.59

N(76)	0		150+150	
FENITROT(76)	0.0	1.5	0.0	1.5
IRRIGTN(76)				
NONE	6.78	6.68	6.75	6.74
FULL	6.78	6.78	6.86	7.04

ALDICARB(76)	0		10	
FENITROT(76)	0.0	1.5	0.0	1.5
IRRIGTN(76)				
NONE	6.78	6.76	6.74	6.66
FULL	7.01	7.01	6.63	6.80

ALDICARB(76)	0		10	
FENITROT(76)	0.0	1.5	0.0	1.5
N(76)				
0	6.88	6.84	6.68	6.62
150+150	6.91	6.93	6.69	6.85

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GRAIN TONNES/HECTARE

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

DIELDRIN(76)	0.0		2.5	
FENITROT(76)	0.0	1.5	0.0	1.5
IRRIGTN(76)				
NONE	6.86	6.73	6.66	6.69
FULL	6.85	6.90	6.79	6.91

DIELDRIN(76)	0.0		2.5	
FENITROT(76)	0.0	1.5	0.0	1.5
N(76)				
0	6.83	6.73	6.73	6.73
150+150	6.88	6.90	6.72	6.88

DIELDRIN(76)	0.0		2.5	
FENITROT(76)	0.0	1.5	0.0	1.5
ALDICARB(76)				
0	7.00	6.90	6.80	6.87
10	6.71	6.73	6.66	6.73

BENOMYL(76)	0		15	
FENITROT(76)	0.0	1.5	0.0	1.5
IRRIGTN(76)				
NONE	6.78	6.81	6.74	6.61
FULL	6.90	6.96	6.74	6.85

BENOMYL(76)	0		15	
FENITROT(76)	0.0	1.5	0.0	1.5
N(76)				
0	6.86	6.78	6.70	6.68
150+150	6.82	6.99	6.78	6.78

BENOMYL(76)	0		15	
FENITROT(76)	0.0	1.5	0.0	1.5
ALDICARB(76)				
0	6.94	6.91	6.85	6.86
10	6.74	6.86	6.63	6.60

BENOMYL(76)	0		15	
FENITROT(76)	0.0	1.5	0.0	1.5
DIELDRIN(76)				
0.0	6.90	6.94	6.80	6.69
2.5	6.78	6.83	6.68	6.77

N(76)	0		150+150	
PIRIMICA(76)	0.00	0.14	0.00	0.14
IRRIGTN(76)				
NONE	6.68	6.78	6.73	6.76
FULL	6.76	6.80	.01	6.88

ALDICARB(76)	0		10	
PIRIMICA(76)	0.00	0.14	0.00	0.14
IRRIGTN(76)				
NONE	6.66	6.88	6.75	6.65
FULL	7.09	6.94	6.68	6.75

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GRAIN TONNES/HECTARE

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

ALDICARB(76)	0		10	
PIRIMICA(76)	0.00	0.14	0.00	0.14
N(76)				
0	6.85	6.87	6.60	6.70
150+150	6.90	6.94	6.84	6.70
DIELDRIN(76)	0.0		2.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
IRRIGTN(76)				
NONE	6.73	6.86	6.68	6.67
FULL	6.85	6.89	6.92	6.79
DIELDRIN(76)	0.0		2.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
N(76)				
0	6.70	6.86	6.75	6.71
150+150	6.89	6.89	6.85	6.75
DIELDRIN(76)	0.0		2.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
ALDICARB(76)				
0	6.95	6.95	6.80	6.87
10	6.64	6.81	6.80	6.60
BENOMYL(76)	0		15	
PIRIMICA(76)	0.00	0.14	0.00	0.14
IRRIGTN(76)				
NONE	6.76	6.83	6.65	6.70
FULL	6.99	6.88	6.78	6.81
BENOMYL(76)	0		15	
PIRIMICA(76)	0.00	0.14	0.00	0.14
N(76)				
0	6.81	6.83	6.63	6.74
150+150	6.94	6.88	6.80	6.77
BENOMYL(76)	0		15	
PIRIMICA(76)	0.00	0.14	0.00	0.14
ALDICARB(76)				
0	6.92	6.93	6.83	6.88
10	6.82	6.78	6.61	6.62
BENOMYL(76)	0		15	
PIRIMICA(76)	0.00	0.14	0.00	0.14
DIELDRIN(76)				
0.0	6.87	6.97	6.71	6.78
2.5	6.87	6.74	6.72	6.73
FENITROT(76)	0.0		1.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
IRRIGTN(76)				
NONE	6.73	6.79	6.68	6.74
FULL	6.85	6.79	6.92	6.89

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GRAIN TONNES/HECTARE

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

FENITROT(76)	0.0		1.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
N(76)				
0	6.77	6.79	6.68	6.78
150+150	6.81	6.79	6.93	6.85

FENITROT(76)	0.0		1.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
ALDICARB(76)				
0	6.90	6.89	6.85	6.93
10	6.67	6.70	6.76	6.70

FENITROT(76)	0.0		1.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
DIELDRIN(76)				
0.0	6.84	6.87	6.75	6.88
2.5	6.74	6.72	6.86	6.75

FENITROT(76)	0.0		1.5	
PIRIMICA(76)	0.00	0.14	0.00	0.14
BENOMYL(76)				
0	6.82	6.87	6.93	6.84
15	6.76	6.72	6.67	6.79

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

TABLE	IRRIGTN(76)	N(76)	ALDICARB(76)	DIELDRIN(76)
SED	0.080	0.050	0.050	0.050

TABLE	BENOMYL(76)	FENITROT(76)	PIRIMICA(76)	IRRIGTN(76) N(76)
SED	0.050	0.050	0.050	0.094
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)				0.070

TABLE	IRRIGTN(76) ALDICARB(76)	N(76) ALDICARB(76)	IRRIGTN(76) DIELDRIN(76)	N(76) DIELDRIN(76)
SED	0.094	0.070	0.094	0.070
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)	0.070		0.070	

TABLE	ALDICARB(76) DIELDRIN(76)	IRRIGTN(76) BENOMYL(76)	N(76) BENOMYL(76)	ALDICARB(76) BENOMYL(76)
SED	0.070	0.094	0.070	0.070
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)		0.070		

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GRAIN TONNES/HECTARE

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

TABLE	DIELDRIN(76) BENOMYL(76)	IRRIGTN(76) FENITROT(76)	N(76) FENITROT(76)	ALDICARB(76) FENITROT(76)
SED	0.070	0.094	0.070	0.070
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)		0.070		

TABLE	DIELDRIN(76) FENITROT(76)	BENOMYL(76) FENITROT(76)	IRRIGTN(76) PIRIMICA(76)	N(76) PIRIMICA(76)
SED	0.070	0.070	0.094	0.070
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)			0.070	

TABLE	ALDICARB(76) PIRIMICA(76)	DIELDRIN(76) PIRIMICA(76)	BENOMYL(76) PIRIMICA(76)	FENITROT(76) PIRIMICA(76)
SED	0.070	0.070	0.070	0.070

TABLE	IRRIGTN(76) N(76) ALDICARB(76)	IRRIGTN(76) N(76) DIELDRIN(76)	IRRIGTN(76) ALDICARB(76) DIELDRIN(76)	N(76) ALDICARB(76) DIELDRIN(76)
SED	0.118	0.118	0.118	0.099
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)	0.099	0.099	0.099	

TABLE	IRRIGTN(76) N(76) BENOMYL(76)	IRRIGTN(76) N(76) BENOMYL(76)	N(76) ALDICARB(76) BENOMYL(76)	IRRIGTN(76) DIELDRIN(76) BENOMYL(76)
SED	0.118	0.118	0.099	0.118
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)	0.099	0.099		0.099

TABLE	N(76) DIELDRIN(76) BENOMYL(76)	ALDICARB(76) DIELDRIN(76) BENOMYL(76)	IRRIGTN(76) N(76) FENITROT(76)	IRRIGTN(76) ALDICARB(76) FENITROT(76)
SED	0.118	0.099	0.118	0.118
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)			0.099	0.099
N(76)	0.099			
DIELDRIN(76)	0.099			
BENOMYL(76)	0.099			

TABLE	N(76) ALDICARB(76) FENITROT(76)	IRRIGTN(76) DIELDRIN(76) FENITROT(76)	N(76) DIELDRIN(76) FENITROT(76)	ALDICARB(76) DIELDRIN(76) FENITROT(76)
SED	0.118	0.118	0.099	0.099
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)		0.099		
N(76)	0.099			
ALDICARB(76)	0.099			
FENITROT(76)	0.099			

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GRAIN TONNES/HECTARE

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

TABLE	IRRIGTN(76) BENOMYL(76) FENITROT(76)	N(76) BENOMYL(76) FENITROT(76)	ALDICARB(76) BENOMYL(76) FENITROT(76)	DIELDRIN(76) BENOMYL(76) FENITROT(76)
SED	0.118	0.099	0.099	0.099
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)	0.099			

TABLE	IRRIGTN(76) N(76) PIRIMICA(76)	IRRIGTN(76) ALDICARB(76) PIRIMICA(76)	N(76) ALDICARB(76) PIRIMICA(76)	IRRIGTN(76) DIELDRIN(76) PIRIMICA(76)
SED	0.118	0.118	0.099	0.118
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)	0.099	0.099		0.099

TABLE	N(76) DIELDRIN(76) PIRIMICA(76)	ALDICARB(76) DIELDRIN(76) PIRIMICA(76)	IRRIGTN(76) BENOMYL(76) PIRIMICA(76)	N(76) BENOMYL(76) PIRIMICA(76)
SED	0.099	0.118	0.118	0.099
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)			0.099	
ALDICARB(76)		0.099		
DIELDRIN(76)		0.099		
PIRIMICA(76)		0.099		

TABLE	ALDICARB(76) BENOMYL(76) PIRIMICA(76)	DIELDRIN(76) BENOMYL(76) PIRIMICA(76)	IRRIGTN(76) FENITROT(76) PIRIMICA(76)	N(76) FENITROT(76) PIRIMICA(76)
SED	0.099	0.099	0.118	0.099
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
IRRIGTN(76)			0.099	

TABLE	ALDICARB(76) FENITROT(76) PIRIMICA(76)	DIELDRIN(76) FENITROT(76) PIRIMICA(76)	BENOMYL(76) FENITROT(76) PIRIMICA(76)
SED	0.099	0.099	0.118
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
BENOMYL(76)			0.099
FENITROT(76)			0.099
PIRIMICA(76)			0.099

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	54	0.281	4.1

GRAIN MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00260

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77/W/CS/181

GREEN MANURE

Object: To study the effects of a green manure sown at different dates and interactions with fertiliser nitrogen on the following crop - Woburn Great Hill III, Lansome III.

Sponsors: G.V. Dyke, G.E.G. Mattingly.

The second year, barley, potatoes.

For previous year see 76/W/CS/181.

Design: 4 series, each a single replicate of 24 plots.

Whole plot dimensions: 4.26 x 6.10.

Treatments:

Series I (barley), Series II (potatoes): All combinations of:-

1. TREFOIL(76) — Trefoil to barley in 1976:

NONE	None
MAY	Undersown in May
MAY/AUG	Undersown in May, sown into stubble after harvest in August
JULY/AUG	Oversown in July before harvest, sown into stubble after harvest in August

2. N 77 — Amounts of nitrogen fertiliser in 1977 (kg N):

Barley	Potatoes	Barley	Potatoes
0	0	0	0
50	100	50 to seedbed	100 to seedbed
100	200	100 to seedbed	200 to seedbed
150	300	150 to seedbed	300 to seedbed
50+50	100+100	50 to seedbed + 50 in May	100 to seedbed + 100 in June
100+50	200+100	100 to seedbed + 50 in May	200 to seedbed + 100 in June

Series III (barley): All combinations of:-

1. TREFOIL(76) — Trefoil to barley in 1976:

NONE	None (duplicated)
AUG	Sown into stubble after harvest in August (duplicated)

2. N 77 — Amounts of nitrogen fertiliser in 1977 (kg N):

0	0
50	50 to seedbed
100	100 to seedbed
150	150 to seedbed
50+50	50 to seedbed + 50 in May
100+50	100 to seedbed + 50 in May

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Series IV (barley): All combinations of:-

1. TREFOIL(767) Trefoil to barley in 1976 and 1977:

0	None
(MAY)APR	Undersown May 1976, April 1977
(J/AU)A	Oversown in July 1976, sown into stubble in August 1976, oversown in August 1977
(AU)AU	Sown into stubble in August 1976 and 1977

2. N 77 Amounts of nitrogen fertiliser (kg N):

	1977	1976
0	0	(0)
50	50 to seedbed	(30)
100	100 to seedbed	(60)
150	150 to seedbed	(90)
50+50	50 to seedbed + 50 in May	(120)
100+50	100 to seedbed + 50 in May	(150)

NOTE: N to Series IV in 1976 was all applied to the seedbed.

Standard applications:
Barley, Great Hill III, Series I & III: Manures: (0:20:20) at 300 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Lansome III, Series IV: Manures: (0:20:20) at 300 kg combine drilled.
Potatoes, Great Hill III, Series II: Manures: (0:14:28) at 1260 kg. Weedkiller: Linuron at 1.3 kg plus paraquat at 0.28 kg ion in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Seed: Julia, dressed with ethirimol, sown at 160 kg.
Potatoes: Maris Piper.
English trefoil 3498, inoculated with Rhizobium, sown at 27 kg.

Cultivations, etc.:-
Barley, Great Hill III, Series I & III: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. Power harrowed: 9 Mar. Seed sown: 10 Mar. Spring N applied: 11 Mar. Weedkiller applied: 11 May. Late N applied: 23 May. Combine harvested: 30 Aug.
Barley, Lansome III, Series IV: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. Seed sown: 10 Mar. Spring N applied, trefoil undersown and raked in: 18 Mar. Late N applied: 23 May. Trefoil oversown: 5 Aug. Combine harvested: 15 Aug.
Potatoes, Great Hill III, Series II: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. PK applied: 6 Apr. Spring N applied, rotary cultivated, potatoes planted: 14 Apr. Grubbed and earthed up: 25 May. Weedkiller applied: 26 May. Late N applied: 20 June. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 4 Oct.

NOTE: Samples of trefoil and weeds were dug just before ploughing for the determination of dry matter and N.

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BARLEY SERIES I

GRAIN TONNES/HECTARE

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

N 77 / TREFOIL(76)	0	50	100	150	50+50	100+50	MEAN
NONE	1.41	3.06	3.14	3.07	3.28	3.28	2.87
MAY	0.89	3.34	3.35	4.43	3.34	3.60	3.16
MAY/AUG	1.47	2.04	2.77	3.74	2.26	3.87	2.69
JULY/AUG	0.38	3.23	2.96	3.58	3.02	3.28	2.74
MEAN	1.04	2.92	3.05	3.71	2.97	3.51	2.87

GRAIN MEAN DM% 83.2

STRAW TONNES/HECTARE

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

N 77 / TREFOIL(76)	0	50	100	150	50+50	100+50	MEAN
NONE	0.60	1.66	1.90	1.80	1.33	1.70	1.50
MAY	0.56	1.54	1.82	2.21	1.37	1.59	1.51
MAY/AUG	0.53	1.01	1.53	2.13	1.18	1.78	1.36
JULY/AUG	0.27	1.24	1.50	2.08	1.53	1.81	1.41
MEAN	0.49	1.36	1.69	2.05	1.35	1.72	1.44

STRAW MEAN DM% 66.6

PLOT AREA HARVESTED 0.00173

BARLEY SERIES III

GRAIN TONNES/HECTARE

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

N 77 / TREFOIL(76)	0	50	100	150	50+50	100+50	MEAN
NONE	0.50	2.04	4.25	3.20	3.14	3.22	2.72
AUG	0.59	2.57	2.96	4.43	3.08	4.44	3.01
MEAN	0.55	2.30	3.60	3.81	3.11	3.83	2.87

GRAIN MEAN DM% 75.2

STRAW TONNES/HECTARE

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

N 77 / TREFOIL(76)	0	50	100	150	50+50	100+50	MEAN
NONE	0.48	1.24	2.26	1.65	1.18	1.47	1.38
AUG	0.27	1.21	1.33	2.38	1.47	2.09	1.46
MEAN	0.38	1.23	1.80	2.02	1.32	1.78	1.42

STRAW MEAN DM% 62.5 PLOT AREA HARVESTED 0.00173

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BARLEY SERIES IV

GRAIN TONNES/HECTARE

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

N 77 TREFOIL(767)	0	50	100	150	50+50	100+50	MEAN
NONE	0.96	3.47	3.86	4.63	3.64	3.86	3.40
(MAY)APR	0.71	3.22	5.13	3.79	3.97	4.97	3.63
(J/AU)A	1.39	3.61	4.33	4.36	4.34	4.05	3.68
(AU)AU	1.09	4.25	4.04	4.31	3.61	4.53	3.64
MEAN	1.04	3.64	4.34	4.27	3.89	4.35	3.59

GRAIN MEAN DM% 79.7

STRAW TONNES/HECTARE

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

N 77 TREFOIL(767)	0	50	100	150	50+50	100+50	MEAN
NONE	0.38	1.90	2.40	2.39	2.32	2.52	1.98
(MAY)APR	0.68	1.59	2.67	2.26	2.30	2.55	2.01
(J/AU)A	0.53	1.26	2.28	2.30	2.26	2.48	1.85
(AU)AU	0.50	2.24	2.02	2.63	2.50	2.86	2.13
MEAN	0.52	1.75	2.34	2.40	2.35	2.60	1.99

STRAW MEAN DM% 74.4 PLOT AREA HARVESTED 0.00173

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

N 77 TREFOIL(76)	0	100	200	300	100+100	200+100	MEAN
NONE	19.4	37.7	31.6	36.9	28.6	28.9	30.5
MAY	22.0	39.8	30.1	34.8	32.7	36.7	32.7
MAY/AUG	19.7	28.4	37.3	33.9	36.1	35.0	31.7
JULY/AUG	15.3	30.9	35.2	33.9	32.4	32.4	30.0
MEAN	19.1	34.2	33.6	34.9	32.5	33.3	31.2

PERCENTAGE WARE 3.81CM (1.5 INCH) MIDDLE

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

N 77 TREFOIL(76)	0	100	200	300	100+100	200+100	MEAN
NONE	83.8	93.1	92.1	92.2	93.2	89.6	90.7
MAY	85.1	93.7	94.3	94.0	91.2	91.5	91.6
MAY/AUG	84.8	88.9	96.1	94.6	92.8	91.0	91.4
JULY/AUG	83.8	91.9	94.1	93.1	91.9	94.4	91.5
MEAN	84.4	91.9	94.2	93.5	92.3	91.6	91.3

PLOT AREA HARVESTED 0.00087

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77/W/CS/183

FACTORS AFFECTING YIELD AND PCN CONTROL

Object: To study the effects of fertiliser, plant density and date of haulm destruction on yield and incidence of Globodera rostochiensis (PCN) and its control by oxamyl - Woburn Long Mead.

Sponsor: A.G. Whitehead.

The second year, potatoes.

For previous year see 76/W/CS/183.

Design: 2 randomised blocks of 32 plots.

Whole plot dimensions: 2.84 x 6.10.

Treatments: All combinations of:-

1. SPACING — Spacing of setts within the ridge (ridges 71 cm (28 inches) apart):

   - 25 CM — 25 cm (10 inches)
   - 50 CM — 50 cm (20 inches)

2. FERTLSER — Fertiliser:

   - STANDARD — Standard, (13:13:20) at 1860 kg to seedbed
   - EXTRA — Standard, (13:13:20) at 1860 kg to seedbed + 119 kg P205 as superphosphate and 377 kg K20 as sulphate of potash in April + 125 kg N in June

3. OXAMYL(76) — Oxamyl (kg) applied in 1976:

   - 0
   - 10

4. OXAMYL(77) — Oxamyl (kg) applied in 1977:

   - 0
   - 10

5. HLM KILL — Date of haulm destruction:

   - STANDARD
   - LATE

NOTE: Treatments other than OXAMYL(76) and (77) were applied cumulatively.

Basal applications: Weedkiller: Metribuzin ('Sencorex' at 1.4 kg) in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide, in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions.

Seed: Pentland Crown.

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Cultivations, etc.:- Ploughed: 7 Mar, 1977. Treatment P and K applied: 8 Apr. Heavy-tine cultivated: 14 Apr. NPK applied: 15 Apr. Oxamyl applied, all plots rotary cultivated, potatoes planted: 18 Apr. Grubbed: 2 May. Fine tooth harrowed, grubbed and earthed up: 25 May. Weedkiller applied: 27 May. N treatment applied: 17 June. Fungicide applied: 24 June, 8 July, 21 July, 12 Aug. Insecticide applied: 8 July, 21 July, 12 Aug. Haulm mechanically destroyed on HLM KILL STANDARD plots: 19 Sept. HLM KILL STANDARD lifted: 3 Oct. HLM KILL LATE lifted: 25 Oct.

NOTE: Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of Globodera rostochiensis.

TOTAL TUBERS TONNES/HECTARE

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

FERTLSER	STANDARD	EXTRA	MEAN
SPACING			
25 CM	32.8	30.3	31.6
50 CM	27.9	32.2	30.1
MEAN	30.4	31.2	30.8

OXAMYL(76)	0	10	MEAN
SPACING			
25 CM	28.6	34.5	31.6
50 CM	27.9	32.2	30.1
MEAN	28.3	33.3	30.8

OXAMYL(76)	0	10	MEAN
FERTLSER			
STANDARD	28.5	32.3	30.4
EXTRA	28.1	34.4	31.2
MEAN	28.3	33.3	30.8

OXAMYL(77)	0	10	MEAN
SPACING			
25 CM	23.4	39.7	31.6
50 CM	17.1	43.0	30.1
MEAN	20.2	41.4	30.8

OXAMYL(77)	0	10	MEAN
FERTLSER			
STANDARD	20.4	40.3	30.4
EXTRA	20.0	42.4	31.2
MEAN	20.2	41.4	30.8

OXAMYL(77)	0	10	MEAN
OXAMYL(76)			
0	19.2	37.4	28.3
10	21.3	45.4	33.3
MEAN	20.2	41.4	30.8

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TOTAL TUBERS TONNES/HECTARE

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

HLM KILL SPACING	STANDARD	LATE	MEAN
25 CM	29.3	33.8	31.6
50 CM	30.7	29.4	30.1
MEAN	30.0	31.6	30.8

HLM KILL FERTLSER	STANDARD	LATE	MEAN
STANDARD	31.9	28.9	30.4
EXTRA	28.1	34.3	31.2
MEAN	30.0	31.6	30.8

HLM KILL OXAMYL(76)	STANDARD	LATE	MEAN
0	27.8	28.8	28.3
10	32.2	34.5	33.3
MEAN	30.0	31.6	30.8

HLM KILL OXAMYL(77)	STANDARD	LATE	MEAN
0	21.9	18.6	20.2
10	38.1	44.6	41.4
MEAN	30.0	31.6	30.8

FERTLSER	STANDARD		EXTRA	
OXAMYL(76)	0	10	0	10
SPACING				
25 CM	31.7	33.9	25.5	35.1
50 CM	25.2	30.7	30.6	33.7

FERTLSER	STANDARD		EXTRA	
OXAMYL(77)	0	10	0	10
SPACING				
25 CM	24.0	41.6	22.7	37.9
50 CM	16.8	39.1	17.3	47.0

OXAMYL(76)	0		10	
OXAMYL(77)	0	10	0	10
SPACING				
25 CM	22.6	34.7	24.2	44.7
50 CM	15.8	40.1	18.4	46.0

OXAMYL(76)	0		10	
OXAMYL(77)	0	10	0	10
FERTLSER				
STANDARD	21.3	35.6	19.5	45.0
EXTRA	17.0	39.2	23.1	45.7

FERTLSER	STANDARD		EXTRA	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	34.5	31.1	24.1	36.5
50 CM	29.2	26.7	32.2	32.2

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TOTAL TUBERS TONNES/HECTARE

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

OXAMYL(76)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	27.4	29.9	31.2	37.7
50 CM	28.2	27.6	33.2	31.2

OXAMYL(76)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER				
STANDARD	29.3	27.6	34.4	30.1
EXTRA	26.3	29.9	30.0	38.8

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	23.1	23.7	35.6	43.9
50 CM	20.7	13.5	40.7	45.4

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER				
STANDARD	23.2	17.6	40.5	40.1
EXTRA	20.5	19.5	35.8	49.1

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
OXAMYL(76)				
0	21.2	17.1	34.4	40.4
10	22.5	20.1	41.9	48.8

OXAMYL(76)	0		10	
OXAMYL(77)	0	10	0	10
SPACING FERTLSER				
25 CM STANDARD	25.6	37.9	22.5	45.2
EXTRA	19.5	31.5	25.9	44.2
50 CM STANDARD	17.1	33.3	16.6	44.8
EXTRA	14.4	46.8	20.2	47.3

OXAMYL(76)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING FERTLSER				
25 CM STANDARD	33.4	30.1	35.7	32.1
EXTRA	21.5	29.6	26.8	43.3
50 CM STANDARD	25.2	25.2	33.2	28.2
EXTRA	31.2	30.1	33.2	34.3

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING FERTLSER				
25 CM STANDARD	26.1	22.0	43.0	40.2
EXTRA	20.1	25.4	28.2	47.5
50 CM STANDARD	20.4	13.3	38.0	40.1
EXTRA	21.0	13.6	43.4	50.7

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TOTAL TUBERS TONNES/HECTARE

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

	OXAMYL(77)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	OXAMYL(76)				
25 CM	0	23.4	21.7	31.5	38.0
	10	22.8	25.7	39.7	49.7
50 CM	0	19.1	12.5	37.3	42.8
	10	22.3	14.5	44.1	48.0

	OXAMYL(77)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER	OXAMYL(76)				
STANDARD	0	24.4	18.2	34.2	37.1
	10	22.0	17.1	46.8	43.2
EXTRA	0	18.0	16.0	34.6	43.8
	10	23.0	23.1	36.9	54.5

		OXAMYL(77)	0		10	
		HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	FERTLSER	OXAMYL(76)				
25 CM	STANDARD	0	30.4	20.8	36.4	39.4
		10	21.7	23.2	49.6	40.9
	EXTRA	0	16.4	22.7	26.5	36.6
		10	23.8	28.1	29.8	58.5
50 CM	STANDARD	0	18.5	15.7	31.9	34.7
		10	22.3	10.9	44.1	45.5
	EXTRA	0	19.7	9.2	42.7	51.0
		10	22.3	18.0	44.1	50.5

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

TABLE	SPACING	FERTLSER	OXAMYL(76)	OXAMYL(77)
SED	2.23	2.23	2.23	2.23

TABLE	HLM KILL	SPACING FERTLSER	SPACING OXAMYL(76)	FERTLSER OXAMYL(76)
SED	2.23	3.15	3.15	3.15

TABLE	SPACING OXAMYL(77)	FERTLSER OXAMYL(77)	OXAMYL(76) OXAMYL(77)	SPACING HLM KILL
SED	3.15	3.15	3.15	3.15

TABLE	FERTLSER HLM KILL	OXAMYL(76) HLM KILL	OXAMYL(77) HLM KILL	SPACING FERTLSER OXAMYL(76)
SED	3.15	3.15	3.15	4.45

TABLE	SPACING FERTLSER OXAMYL(77)	SPACING OXAMYL(76) OXAMYL(77)	FERTLSER OXAMYL(76) OXAMYL(77)	SPACING FERTLSER HLM KILL
SED	4.45	4.45	4.45	4.45

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TOTAL TUBERS TONNES/HECTARE

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

TABLE	SPACING OXAMYL(76) HLM KILL	FERTLSER OXAMYL(76) HLM KILL	SPACING OXAMYL(77) HLM KILL	FERTLSER OXAMYL(77) HLM KILL
SED	4.45	4.45	4.45	4.45

TABLE	OXAMYL(76) OXAMYL(77) HLM KILL	SPACING FERTLSER OXAMYL(76) OXAMYL(77)	SPACING FERTLSER OXAMYL(76) HLM KILL	SPACING FERTLSER OXAMYL(77) HLM KILL
SED	4.45	6.30	6.30	6.30

TABLE	SPACING OXAMYL(76) OXAMYL(77) HLM KILL	FERTLSER OXAMYL(76) OXAMYL(77) HLM KILL	SPACING FERTLSER OXAMYL(76) OXAMYL(77) HLM KILL
SED	6.30	6.30	8.90

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

STRATUM	DF	SE	CV%
BLOCK.WP	30	8.90	28.9

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

FERTLSER SPACING	STANDARD	EXTRA	MEAN
25 CM	85.6	80.8	83.2
50 CM	88.3	90.1	89.2
MEAN	87.0	85.5	86.2

OXAMYL(76) SPACING	0	10	MEAN
25 CM	83.5	82.9	83.2
50 CM	88.1	90.4	89.2
MEAN	85.8	86.7	86.2

OXAMYL(76) FERTLSER	0	10	MEAN
STANDARD	87.4	86.5	87.0
EXTRA	84.2	86.8	85.5
MEAN	85.8	86.7	86.2

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PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

OXAMYL(77)	0	10	MEAN
SPACING			
25 CM	81.4	85.0	83.2
50 CM	86.9	91.6	89.2
MEAN	84.1	88.3	86.2

OXAMYL(77)	0	10	MEAN
FERTLSER			
STANDARD	85.1	88.8	87.0
EXTRA	83.2	87.8	85.5
MEAN	84.1	88.3	86.2

OXAMYL(77)	0	10	MEAN
OXAMYL(76)			
0	84.0	87.5	85.8
10	84.2	89.1	86.7
MEAN	84.1	88.3	86.2

HLM KILL	STANDARD	LATE	MEAN
SPACING			
25 CM	80.6	85.9	83.2
50 CM	90.8	87.7	89.2
MEAN	85.7	86.8	86.2

HLM KILL	STANDARD	LATE	MEAN
FERTLSER			
STANDARD	87.7	86.2	87.0
EXTRA	83.7	87.3	85.5
MEAN	85.7	86.8	86.2

HLM KILL	STANDARD	LATE	MEAN
OXAMYL(76)			
0	86.6	85.0	85.8
10	84.8	88.5	86.7
MEAN	85.7	86.8	86.2

HLM KILL	STANDARD	LATE	MEAN
OXAMYL(77)			
0	84.8	83.5	84.1
10	86.6	90.1	88.3
MEAN	85.7	86.8	86.2

FERTLSER	STANDARD		EXTRA	
OXAMYL(76)	0	10	0	10
SPACING				
25 CM	87.8	83.4	79.2	82.5
50 CM	86.9	89.7	89.2	91.1

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PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

FERTLSER	STANDARD		EXTRA	
OXAMYL(77)	0	10	0	10
SPACING				
25 CM	84.2	87.0	78.6	83.0
50 CM	86.0	90.6	87.7	92.6

OXAMYL(76)	0		10	
OXAMYL(77)	0	10	0	10
SPACING				
25 CM	82.4	84.6	80.4	85.5
50 CM	85.7	90.5	88.1	92.7

OXAMYL(76)	0		10	
OXAMYL(77)	0	10	0	10
FERTLSER				
STANDARD	86.1	88.6	84.1	89.0
EXTRA	81.9	86.5	84.4	89.1

FERTLSER	STANDARD		EXTRA	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	84.7	86.5	76.4	85.2
50 CM	90.6	86.0	91.0	89.3

OXAMYL(76)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	82.7	84.3	78.4	87.4
50 CM	90.4	85.7	91.2	89.6

OXAMYL(76)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER				
STANDARD	89.4	85.3	85.9	87.1
EXTRA	83.7	84.7	83.7	89.9

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING				
25 CM	79.3	83.5	81.8	88.2
50 CM	90.3	83.4	91.3	91.9

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER				
STANDARD	87.2	83.0	88.2	89.5
EXTRA	82.4	83.9	84.9	90.7

OXAMYL(77)	0		10	
HLM KILL	STANDARD	LATE	STANDARD	LATE
OXAMYL(76)				
0	86.8	81.3	86.3	88.7
10	82.8	85.7	86.8	91.4

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PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

	OXAMYL(76)	0		10	
	OXAMYL(77)	0	10	0	10
SPACING	FERTLSER				
25 CM	STANDARD	87.1	88.4	81.2	85.6
	EXTRA	77.6	80.7	79.6	85.3
50 CM	STANDARD	85.2	88.7	86.9	92.5
	EXTRA	86.2	92.2	89.2	92.9

	OXAMYL(76)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	FERTLSER				
25 CM	STANDARD	88.6	87.0	80.9	85.9
	EXTRA	76.8	81.5	76.0	88.9
50 CM	STANDARD	90.3	83.6	91.0	88.4
	EXTRA	90.6	87.8	91.3	90.8

	OXAMYL(77)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	FERTLSER				
25 CM	STANDARD	83.9	84.4	85.5	88.5
	EXTRA	74.7	82.6	78.2	87.9
50 CM	STANDARD	90.5	81.6	90.8	90.4
	EXTRA	90.2	85.2	91.7	93.4

	OXAMYL(77)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	OXAMYL(76)				
25 CM	0	82.8	82.0	82.6	86.6
	10	75.8	85.0	81.1	89.8
50 CM	0	90.8	80.6	90.1	90.9
	10	89.9	86.3	92.5	92.9

	OXAMYL(77)	0		10	
	HLM KILL	STANDARD	LATE	STANDARD	LATE
FERTLSER	OXAMYL(76)				
STANDARD	0	90.8	81.5	88.0	89.2
	10	83.6	84.5	88.3	89.8
EXTRA	0	82.8	81.1	84.6	88.3
	10	82.1	86.8	85.3	93.0

		OXAMYL(77)	0		10	
		HLM KILL	STANDARD	LATE	STANDARD	LATE
SPACING	FERTLSER	OXAMYL(76)				
25 CM	STANDARD	0	89.8	84.5	87.3	89.6
		10	78.1	84.4	83.7	87.5
	EXTRA	0	75.8	79.5	77.8	83.6
		10	73.5	85.7	78.5	92.1
50 CM	STANDARD	0	91.8	78.5	88.7	88.8
		10	89.1	84.7	92.9	92.0
	EXTRA	0	89.8	82.6	91.5	93.0
		10	90.6	87.8	92.0	93.9

PLOT AREA HARVESTED 0.0087

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77/W/CS/184

CEREAL CYST NEMATODE STUDY

Object: To study the effects of varieties, aldicarb and formalin on cereal cyst nematode (Heterodera avenae), the fungus Entomophthora and on the yield of oats - Woburn Butt Close.

Sponsor: T.D. Williams.

The second year, oats.

For previous year see 76/W/CS/184.

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

Whole plot dimensions: 2.13 x 21.0.

Treatments: All combinations of:-

Whole plots

1. VARIETY(77) Varieties and resistance to cereal cyst nematode:

   NELSON/R Nelson (resistant)
   TABARD/S Maris Tabard (susceptible)

2. ALDICARB(77) Aldicarb to seedbed (kg):

   0
   10

Sub plots

3. FORMALIN(76) Formalin applied in 1976 (l):

   0
   3000

4. FORMALIN(77) Formalin applied in 1977 (l):

   0
   3000

Basal applications: Manures: (20:14:14) at 380 kg combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 280 l. Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 340 l. 2, 4-D at 0.56 kg plus dichlorprop at 2.2 kg in 340 l.

Seed: Sown at 200 kg.

Cultivations, etc.:- Paraquat applied: 10 Aug, 1976. Rotary cultivated: 21 Sept. Ploughed: 15 Nov. Spring-tine cultivated with crumbler attached: 15 Feb, 1977. Formalin applied: 16 Feb. Aldicarb applied, and these plots only rotary cultivated, all plots spring-tine cultivated: 15 Mar. Spring-tine cultivated with crumbler attached, seed sown: 30 Mar. Ioxynil with mecoprop applied: 18 May. 2, 4-D with dichlorprop applied: 2 June. Combine harvested: 3 Sept.

NOTES: (1) Plant samples were taken in May for measurements of fresh tops and root weights.
(2) Estimates were made in June of populations of Heterodera avenae remaining from the unhatched residues of the 1976 population.
(3) Soil samples were taken in July for counts of white females of Heterodera avenae.

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77/W/CS/184

GRAIN TONNES/HECTARE

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

ALDICARB(77)	0	10	MEAN
VARIETY(77)			
NELSON/R	1.89	3.55	2.72
TABARD/S	2.21	4.06	3.14
MEAN	2.05	3.81	2.93

FORMALIN(76)	0	3000	MEAN
VARIETY(77)			
NELSON/R	2.66	2.78	2.72
TABARD/S	3.17	3.11	3.14
MEAN	2.92	2.94	2.93

FORMALIN(76)	0	3000	MEAN
ALDICARB(77)			
0	2.07	2.04	2.05
10	3.76	3.85	3.81
MEAN	2.92	2.94	2.93

FORMALIN(77)	0	3000	MEAN
VARIETY(77)			
NELSON/R	2.67	2.78	2.72
TABARD/S	3.03	3.24	3.14
MEAN	2.85	3.01	2.93

FORMALIN(77)	0	3000	MEAN
ALDICARB(77)			
0	1.94	2.16	2.05
10	3.75	3.86	3.81
MEAN	2.85	3.01	2.93

FORMALIN(77)	0	3000	MEAN
FORMALIN(76)			
0	2.81	3.02	2.92
3000	2.89	3.00	2.94
MEAN	2.85	3.01	2.93

ALDICARB(77)	0		10	
FORMALIN(76)	0	3000	0	3000
VARIETY(77)				
NELSON/R	1.92	1.87	3.41	3.70
TABARD/S	2.22	2.20	4.12	4.01

ALDICARB(77)	0		10	
FORMALIN(77)	0	3000	0	3000
VARIETY(77)				
NELSON/R	1.76	2.02	3.57	3.54
TABARD/S	2.12	2.30	3.93	4.19

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77/W/CS/184

GRAIN TONNES/HECTARE

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

FORMALIN(76)	0		3000	
FORMALIN(77)	0	3000	0	3000
VARIETY(77)				
NELSON/R	2.56	2.77	2.78	2.79
TABARD/S	3.06	3.28	3.00	3.21

FORMALIN(76)	0		3000	
FORMALIN(77)	0	3000	0	3000
ALDICARB(77)				
0	1.95	2.19	1.94	2.13
10	3.67	3.85	3.83	3.87

	FORMALIN(76)	0		3000	
	FORMALIN(77)	0	3000	0	3000
VARIETY(77)	ALDICARB(77)				
NELSON/R	0	1.69	2.15	1.84	1.89
	10	3.43	3.38	3.71	3.69
TABARD/S	0	2.21	2.23	2.04	2.36
	10	3.91	4.32	3.96	4.06

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

TABLE	VARIETY(77)	ALDICARB(77)	FORMALIN(76)	FORMALIN(77)
SED	0.100	0.100	0.075	0.075

TABLE	VARIETY(77) ALDICARB(77)	VARIETY(77) FORMALIN(76)	ALDICARB(77) FORMALIN(76)	VARIETY(77) FORMALIN(77)
SED	0.142	0.126	0.126	0.126
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY(77)		0.107		0.107
ALDICARB(77)			0.107	

TABLE	ALDICARB(77) FORMALIN(77)	FORMALIN(76) FORMALIN(77)	VARIETY(77) ALDICARB(77) FORMALIN(76)	VARIETY(77) ALDICARB(77) FORMALIN(77)
SED	0.126	0.107	0.178	0.178
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
ALDICARB(77)	0.107			
VARIETY(77).ALDICARB(77)			0.151	0.151

TABLE	VARIETY(77) FORMALIN(76) FORMALIN(77)	ALDICARB(77) FORMALIN(76) FORMALIN(77)	VARIETY(77) ALDICARB(77) FORMALIN(76) FORMALIN(77)
SED	0.165	0.165	0.233
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY(77)	0.151		
ALDICARB(77)		0.151	
VARIETY(77).ALDICARB(77)			0.214

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GRAIN TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.201	6.8
BLOCK.WP.SP	36	0.302	10.3

GRAIN MEAN DM% 80.4

STRAW TONNES/HECTARE

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

ALDICARB(77)	0	10	MEAN
VARIETY(77)			
NELSON/R	1.64	2.64	2.14
TABARD/S	1.72	2.85	2.28
MEAN	1.68	2.74	2.21

FORMALIN(76)	0	3000	MEAN
VARIETY(77)			
NELSON/R	2.11	2.16	2.14
TABARD/S	2.34	2.22	2.28
MEAN	2.23	2.19	2.21

FORMALIN(76)	0	3000	MEAN
ALDICARB(77)			
0	1.68	1.67	1.68
10	2.78	2.71	2.74
MEAN	2.23	2.19	2.21

FORMALIN(77)	0	3000	MEAN
VARIETY(77)			
NELSON/R	2.04	2.24	2.14
TABARD/S	2.23	2.34	2.28
MEAN	2.13	2.29	2.21

FORMALIN(77)	0	3000	MEAN
ALDICARB(77)			
0	1.52	1.83	1.68
10	2.74	2.75	2.74
MEAN	2.13	2.29	2.21

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STRAW TONNES/HECTARE

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

FORMALIN(77)	0	3000	MEAN
FORMALIN(76)			
0	2.10	2.36	2.23
3000	2.17	2.22	2.19
MEAN	2.13	2.29	2.21

ALDICARB(77)	0		10	
FORMALIN(76)	0	3000	0	3000
VARIETY(77)				
NELSON/R	1.57	1.70	2.65	2.63
TABARD/S	1.79	1.65	2.90	2.80

ALDICARB(77)	0		10	
FORMALIN(77)	0	3000	0	3000
VARIETY(77)				
NELSON/R	1.45	1.82	2.62	2.66
TABARD/S	1.60	1.84	2.86	2.84

FORMALIN(76)	0		3000	
FORMALIN(77)	0	3000	0	3000
VARIETY(77)				
NELSON/R	1.96	2.26	2.11	2.21
TABARD/S	2.23	2.45	2.22	2.23

FORMALIN(76)	0		3000	
FORMALIN(77)	0	3000	0	3000
ALDICARB(77)				
0	1.46	1.90	1.59	1.76
10	2.74	2.82	2.75	2.68

	FORMALIN(76)	0		3000	
	FORMALIN(77)	0	3000	0	3000
VARIETY(77)	ALDICARB(77)				
NELSON/R	0	1.32	1.83	1.58	1.81
	10	2.60	2.70	2.64	2.61
TABARD/S	0	1.60	1.98	1.60	1.71
	10	2.87	2.93	2.85	2.75

STRAW MEAN DM% 69.7

SUB PLOT AREA HARVESTED 0.00098

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77/R/CS/185

LATE N

Object: To study the residual effects on wheat of a range of fertilisers applied to potatoes in 1976 - Gt. Knott III.

Sponsors: T.M. Addiscott, J. Ashworth, A. Penny, F.V. Widdowson.

The second year, wheat.

For previous year see 76/R/CS/185.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 12.19.

Treatments applied in 1976: All combinations of:-

1. N FORM(76) Forms of nitrogen fertiliser:

AA	Aqueous ammonia injected before planting
AA+NITRA	Aqueous ammonia + nitrapyrin ('N-Serve') at 1.1 kg injected before planting
AA+ATC	Aqueous ammonia + ammonium trithiocarbonate at 18 kg injected before planting
IB SMALL	IBDU (isobutylidene diurea), small granules to seedbed
IB LARGE	IBDU, large granules to seedbed
AN E+L	Ammonium nitrate half in seedbed, half in mid-June
AN E	Ammonium nitrate all in seedbed

2. N RATE(1) Rates of nitrogen fertiliser (kg N):

200
300

plus four extra treatments given ammonium nitrate, all in the seedbed (kg N):

N RATE(2)

AN E 150
AN E 250
AN E 350
AN E 400

Basal applications: Manures: (0:20:20) at 250 kg, combine drilled. 'Nitro-Chalk' at 280 kg. Weedkillers: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l. Growth regulator: Chlormequat at 1.7 l in 220 l.

Seed: Atou, sown at 200 kg.

Cultivations, etc.:- Deep-tine cultivated twice: 10 Dec, 1976. Rotary harrowed and seed sown: 16 Dec. N applied: 19 Apr, 1977. Weedkillers applied: 10 May. Growth regulator applied: 2 June. Insecticide applied: 13 July. Combine harvested: 9 Sept.

NOTE: An adjustment has been made by covariance for differences between rows of plots, which run in the direction of a valley across the site.

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77/R/CS/185

GRAIN TONNES/HECTARE

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

N RATE(1) / N FORM	200	300	MEAN
AA	6.26	6.12	6.19
AA+NITRA	6.50	6.78	6.64
AA+ATC	6.06	6.29	6.18
IB SMALL	6.61	7.16	6.88
IB LARGE	6.56	7.12	6.84
AN E+L	6.11	6.57	6.34
AN E	6.06	6.29	6.18
MEAN	6.31	6.62	6.46

N RATE(2)	AN E 150	AN E 250	AN E 350	AN E 400	MEAN
	6.25	6.37	6.31	6.42	6.34

GRAND MEAN 6.44

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

TABLE	N RATE(2)	N FORM	N RATE(1)	N FORM N RATE(1) & N RATE(2)
SED	0.361	0.250	0.127	0.348

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.390	6.1

GRAIN MEAN DM% 78.7

PLOT AREA HARVESTED 0.00347

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77/R/CS/193

EFFECTS OF PATHOGENS

Object: To study the effects and interactions of several factors on yield and pathogens of winter oilseed rape - Summerdells I.

Sponsor: C.J. Rawlinson.

The second year, winter oilseed rape.

For previous year see 76/R/RA/1.

Design: Two replicates of 3 x 2 x 2 x 2 fully randomised.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1.	WEEDKLLR	Weedkillers:
	PROPYZAM	Propyzamide (none in 1976)
	CARBETAM	Carbetamide in 1976 & 1977
	DALAPON	Dalapon in 1976 & 1977
2.	NEMACIDE	Nematicide (cumulative):
	NONE	None
	ALDICARB	Aldicarb at 10 kg on 20 Sept, 1976
3.	FUNGCIDE	Fungicide (cumulative):
	NONE	None
	BENOMYL	Benomyl seed dressing and foliar sprays
4.	VARIETY	Varieties (cumulative):
	EURORA	Eurora (low erucic acid)
	VICTOR	Victor (high erucic acid)

NOTES: (1) Weedkillers were applied in 340 l. Propyzamide at 0.65 kg, carbetamide at 2.0 kg and dalapon at 3.0 kg on 10 Dec, 1976.
(2) Benomyl foliar sprays were applied at 1.12 kg in 340 l on 7 Jan, 1977 and 15 Apr.
(3) Benomyl seed dressing was applied at 0.5 g per kg of seed.

Basal applications: Manures: (10:24:24) at 310 kg, 'Nitro-Chalk' at 800 kg. Haulm desiccant: Diquat at 0.59 kg ion plus 'Agral' (a wetting agent) at 0.3 l in 340 l.

Seed: Eurora, sown at 13 kg.
Victor, sown at 16 kg.

Cultivations, etc.:- Deep-tine cultivated: 1 Sept, 1976. NPK applied: 3 Sept. Ploughed, rolled: 8 Sept. Harrowed: 21 Sept. Rolled and seed sown: 22 Sept. N applied: 7 Mar, 1977. Haulm desiccant applied: 4 Aug. Combine harvested: 12 Aug.

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NOTES: (1) Seedling counts were made and foliar pathogens assessed on three occasions.

(2) Owing to combine failure, yields from two plots were lost, those with treatment combinations:-

WEEDKLLR	NEMACIDE	VARIETY	FUNGCIDE
DALAPON	NONE	EURORA	NONE
CARBETAM	ALDICARB	EURORA	BENOMYL

Estimated values were used in the analysis.

(3) Nine plots were severely damaged by pigeon grazing in early spring. Examination of the grain yields from these plots suggested that yields were little affected, and estimated values were not used in the analysis.

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GRAIN TONNES/HECTARE

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

NEMACIDE	NONE	ALDICARB	MEAN
WEEDKLLR			
PROPYZAM	2.47	1.93	2.20
CARBETAM	1.95	1.61	1.78
DALAPON	1.79	1.93	1.86
MEAN	2.07	1.83	1.95

FUNGCIDE	NONE	BENOMYL	MEAN
WEEDKLLR			
PROPYZAM	2.21	2.19	2.20
CARBETAM	1.98	1.59	1.78
DALAPON	2.06	1.66	1.86
MEAN	2.08	1.81	1.95

FUNGCIDE	NONE	BENOMYL	MEAN
NEMACIDE			
NONE	2.18	1.96	2.07
ALDICARB	1.99	1.66	1.83
MEAN	2.08	1.81	1.95

VARIETY	EURORA	VICTOR	MEAN
WEEDKLLR			
PROPYZAM	1.82	2.59	2.20
CARBETAM	1.45	2.11	1.78
DALAPON	1.22	2.51	1.86
MEAN	1.49	2.40	1.95

VARIETY	EURORA	VICTOR	MEAN
NEMACIDE			
NONE	1.62	2.52	2.07
ALDICARB	1.37	2.28	1.83
MEAN	1.49	2.40	1.95

VARIETY	EURORA	VICTOR	MEAN
FUNGCIDE			
NONE	1.55	2.62	2.08
BENOMYL	1.44	2.18	1.81
MEAN	1.49	2.40	1.95

NEMACIDE	NONE		ALDICARB	
FUNGCIDE	NONE	BENOMYL	NONE	BENOMYL
WEEDKLLR				
PROPYZAM	2.44	2.51	1.99	1.87
CARBETAM	2.04	1.86	1.91	1.31
DALAPON	2.06	1.51	2.06	1.81

NEMACIDE	NONE		ALDICARB	
VARIETY	EURORA	VICTOR	EURORA	VICTOR
WEEDKLLR				
PROPYZAM	2.04	2.91	1.59	2.27
CARBETAM	1.64	2.27	1.26	1.96
DALAPON	1.19	2.39	1.24	2.63

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GRAIN TONNES/HECTARE

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

FUNGCIDE	NONE		BENOMYL	
VARIETY	EURORA	VICTOR	EURORA	VICTOR
WEEDKLLR				
PROPYZAM	1.65	2.77	1.98	2.41
CARBETAM	1.46	2.50	1.44	1.73
DALAPON	1.52	2.61	0.91	2.41

FUNGCIDE	NONE		BENOMYL	
VARIETY	EURORA	VICTOR	EURORA	VICTOR
NEMACIDE				
NONE	1.68	2.69	1.56	2.36
ALDICARB	1.41	2.56	1.32	2.01

	FUNGCIDE	NONE		BENOMYL	
	VARIETY	EURORA	VICTOR	EURORA	VICTOR
WEEDKLLR	NEMACIDE				
PROPYZAM	NONE	1.88	3.00	2.19	2.83
	ALDICARB	1.43	2.55	1.76	1.99
CARBETAM	NONE	1.44	2.64	1.83	1.89
	ALDICARB	1.48	2.35	1.04	1.58
DALAPON	NONE	1.72	2.41	0.67	2.36
	ALDICARB	1.33	2.80	1.16	2.45

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

TABLE	WEEDKLLR	NEMACIDE	FUNGCIDE	VARIETY
SED	0.144	0.117	0.117	0.117

TABLE	WEEDKLLR NEMACIDE	WEEDKLLR FUNGCIDE	NEMACIDE FUNGCIDE	WEEDKLLR VARIETY
SED	0.203	0.203	0.166	0.203

TABLE	NEMACIDE VARIETY	FUNGCIDE VARIETY	WEEDKLLR NEMACIDE FUNGCIDE	WEEDKLLR NEMACIDE VARIETY
SED	0.166	0.166	0.288	0.288

TABLE	WEEDKLLR FUNGCIDE VARIETY	NEMACIDE FUNGCIDE VARIETY	WEEDKLLR NEMACIDE FUNGCIDE VARIETY
SED	0.288	0.235	0.407

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

STRATUM	DF	SE	CV%
WP	22	0.407	20.9

GRAIN MEAN DM% 86.2

PLOT AREA HARVESTED 0.00279

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77/R/CS/195

AQUEOUS AMMONIA AND NITRIFICATION INHIBITORS

Object: To study the residual effects of adding a range of nitrification inhibitors to aqueous ammonia on the yield and nitrogen uptake of grass cut for silage - Bones Close.

Sponsors: J. Ashworth, G.G. Briggs, A. Penny.

The second year, old grass.

For previous year see 76/R/G/1.

Design: 2 randomised blocks of 24 plots split into 2.

Whole plot dimensions: 2.43 x 9.14.

Treatments: All combinations of:-

Whole plots

1. NI INHIB(76) — Nitrification inhibitors added to aqueous ammonia applied at 375 kg N, as a single application in 1976, injection tines spaced 30 cm apart:

   - CS2 — Carbon disulphide
   - NITRAPYR — Nitrapyrin ('N-Serve')

2. NI RATE(76) — Rates of nitrification inhibitors in 1976:

   - 1 — 1 (5 kg carbon disulphide; 0.5 kg nitrapyrin)
   - 2 — 2 (12.5 kg carbon disulphide; 1.25 kg nitrapyrin)
   - 3 — 3 (25 kg carbon disulphide; 2.5 kg nitrapyrin)

3. NI TIME(76) — Times of applying aqueous ammonia and nitrification inhibitors:

   - AUTUMN — Autumn 1975
   - SPRING — Spring 1976

Sub plots

4. N PERCUT(77) — Nitrogen fertiliser, 'Nitro-Chalk' per cut (kg N) in 1977:

   - 0
   - 83

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Plus all combinations of:-

Whole plots

1. AA(76) Aqueous ammonia applied as above, in 1976 only:

AQ/A	Alone, in autumn
AQ/S	Alone, in spring
AQ+CN1/A	With a mixture of carbon disulphide (12.5 kg) and nitrapyrin (0.5 kg) in autumn 1975
AQ+CN2/A	With a mixture of carbon disulphide (12.5 kg) and nitrapyrin (1.25 kg) in autumn 1975
AQ+AT1/S	With ammonium trithiocarbonate (4 kg) in spring 1976
AQ+AT2/S	With ammonium trithiocarbonate (10 kg) in spring 1976
AQ+AT3/S	With ammonium trithiocarbonate (20 kg) in spring 1976
AQ+ST/A	With sodium trithiocarbonate (25 kg) in autumn 1975

Sub plots

2. N PERCUT(77) Nitrogen fertiliser, 'Nitro-Chalk' per cut (kg N) in 1977:

0
83

Plus all combinations of:-

Whole plots

1. N PERCUT Nitrogen fertiliser, 'Nitro-Chalk', per cut (kg N):

83
125
167

Sub plots

2. YEAR Years of application:

1976	1976 only
1976 77	1976 and 1977

Plus one extra plot:-

EXTRA	Untreated 1976 and 1977
NONE	

NOTE: Yields were only taken from the first cut in 1977.

Basal applications: Manures: (0:14:28) at 500 kg.

Cultivations, etc.:- PK applied: 9 Dec, 1976. 'Nitro-Chalk' applied: 10 Mar, 1977. Cut: 25 May.

NOTE: Crop samples were taken for N determinations.

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77/R/CS/195

1ST AND ONLY CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

NI RATE(76)	1	2	3	MEAN
NI INHIB(76)				
CS2	4.84	4.77	4.34	4.65
NITRAPYR	4.57	5.00	4.91	4.83
MEAN	4.71	4.88	4.62	4.74

NI TIME(76)	AUTUMN	SPRING	MEAN
NI INHIB(76)			
CS2	4.72	4.57	4.65
NITRAPYR	4.62	5.04	4.83
MEAN	4.67	4.81	4.74

NI TIME(76)	AUTUMN	SPRING	MEAN
NI RATE(76)			
1	4.62	4.80	4.71
2	4.73	5.03	4.88
3	4.66	4.59	4.62
MEAN	4.67	4.81	4.74

N PERCUT(77)	0	83	MEAN
NI INHIB(76)			
CS2	3.67	5.62	4.65
NITRAPYR	4.04	5.62	4.83
MEAN	3.85	5.62	4.74

N PERCUT(77)	0	83	MEAN
NI RATE(76)			
1	3.83	5.59	4.71
2	3.94	5.83	4.88
3	3.80	5.45	4.62
MEAN	3.85	5.62	4.74

N PERCUT(77)	0	83	MEAN
NI TIME(76)			
AUTUMN	3.69	5.65	4.67
SPRING	4.02	5.60	4.81
MEAN	3.85	5.62	4.74

NI RATE(76)	1		2		3	
NI TIME(76)	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI INHIB(76)						
CS2	4.77	4.91	4.79	4.74	4.61	4.07
NITRAPYR	4.47	4.68	4.67	5.33	4.71	5.11

NI RATE(76)	1		2		3	
N PERCUT(77)	0	83	0	83	0	83
NI INHIB(76)						
CS2	3.99	5.69	3.64	5.89	3.38	5.30
NITRAPYR	3.66	5.49	4.24	5.76	4.22	5.61

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77/R/CS/195

1ST AND ONLY CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

NI TIME(76)	AUTUMN		SPRING	
N PERCUT(77)	0	83	0	83
NI INHIB(76)				
CS2	3.61	5.84	3.74	5.41
NITRAPYR	3.78	5.45	4.29	5.78

NI TIME(76)	AUTUMN		SPRING	
N PERCUT(77)	0	83	0	83
NI RATE(76)				
1	3.68	5.55	3.97	5.62
2	3.81	5.66	4.07	6.00
3	3.59	5.73	4.01	5.17

	NI TIME(76)	AUTUMN		SPRING	
	N PERCUT(77)	0	83	0	83
NI INHIB(76)	NI RATE(76)				
CS2	1	3.88	5.66	4.11	5.72
	2	3.62	5.96	3.66	5.82
	3	3.32	5.90	3.45	4.69
NITRAPYR	1	3.49	5.45	3.83	5.53
	2	3.99	5.35	4.48	6.18
	3	3.86	5.56	4.57	5.65

N PERCUT(77)	0	83	MEAN
AA(76)			
AQ/A	3.66	5.54	4.60
AQ/S	3.11	4.83	3.97
AQ+CN1/A	3.61	5.98	4.79
AQ+CN2/A	3.87	5.91	4.89
AQ+AT1/S	3.13	5.43	4.28
AQ+AT2/S	3.26	5.27	4.27
AQ+AT3/S	4.18	5.73	4.95
AQ+ST/A	3.44	5.16	4.30
MEAN	3.53	5.48	4.51

N PERCUT	83	125	167	MEAN
YEAR				
1976	3.43	3.44	4.06	3.64
1976 77	5.46	5.45	5.94	5.61
MEAN	4.44	4.45	5.00	4.63

EXTRA NONE 2.81

GRAND MEAN 4.57

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77/R/CS/195

1ST AND ONLY CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

TABLE	NI INHIB(76)	NI RATE(76)	NI TIME(76)	N PERCUT(77)
SED	0.182	0.223	0.182	0.107 0.131*

TABLE	AA(76)	N PERCUT	YEAR	NI INHIB(76) NI RATE(76)
SED	0.445	0.445	0.214	0.315

TABLE	NI INHIB(76) NI TIME(76)	NI RATE(76) NI TIME(76)	NI INHIB(76) N PERCUT(77)	NI RATE(76) N PERCUT(77)
SED	0.257	0.315	0.211	0.258
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
NI INHIB(76)			0.151	
NI RATE(76)				0.186

TABLE	NI TIME(76) N PERCUT(77)	AA(76) NPERCUT(77)	N PERCUT YEAR	NI INHIB(76) NI RATE(76) NI TIME(76)
SED	0.211	0.517	0.517	0.445
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
NI TIME(76)	0.151			
AA(76)		0.371		
N PERCUT			0.371	

TABLE	NI INHIB(76) NI RATE 76)	NI INHIB(76) NI TIME(76)	NI RATE(76) NI TIME(76)	NI INHIB(76) NI RATE(76) NI TIME(76) N PERCUT(77)
SED	0.365	0.298	0.365	0.517
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
NI INHIB(76) .NI RATE(76)	0.262			
NI INHIB(66).NI TIME(76)		0.214		
NI RATE(76).NI TIME(76)			0.262	
NI INHIB(76).NI RATE(76).NI TIME(76)				0.371

* USE ONLY WITH TABLES INVOLVING AA(76)

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

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.445	9.7
BLOCK.WP.SP	23	0.371	8.1

1ST CUT MEAN DM% 21.6

SUB PLOT AREA HARVESTED 0.00048

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77/R/CS/196

SINGLE AND DIVIDED APPLICATIONS OF ALDICARB

Object: To study the effects of single and divided applications of aldicarb on control of stem-eelworm (Ditylenchus dipsaci) and on the yield of spring-sown onions - Gt. Field I.

Sponsor: A.G. Whitehead.

The second year, spring-sown onions.

For previous year see 76/R/ON/1.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 1.52 x 6.10.

Treatments cumulative to 1976: All combinations of:-

1. ALD RATE Rates of aldicarb (kg):

   1.9
   3.8
   7.6

2. ALD TIME Times of applying aldicarb:

   SINGLE All to seedbed (10 Mar)
   DIVIDED Half to seedbed, half in June (10 Mar, 9 June)

EXTRA plus one extra treatment

NONE No aldicarb

Basal applications: Manures: (13:13:20) at 1880 kg. Weedkillers: Propachlor ('Ramrod' at 6.7 kg in 400 l). Pyrazone with chlorbufam ('Alicep' at 4.5 kg i.n 400 l).

Seed: Robusta, dressed with dieldrin, sown at 6.7 kg.

Cultivations, etc.:- Ploughed: 18 Sept, 1976. NPK applied: 9 Mar, 1977. Power harrowed and seed sown: 10 Mar. 'Ramrod' applied: 18 Mar. 'Alicep' applied: 9 June. Lifted: 17 Oct.

NOTES: (1) Soil samples were taken for counts of Ditylenchus dipsaci.
(2) EXTRA NONE: All plots were destroyed by stem nematodes.

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77/R/CS/196

HEALTHY ONIONS TONNES/HECTARE

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

ALD TIME ALD RATE	SINGLE	DIVIDED	MEAN
1.9	37.1	37.3	37.2
3.8	39.7	44.3	42.0
7.6	36.5	40.5	38.5
MEAN	37.7	40.7	39.2

EXTRA NONE 0.0

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

TABLE	ALD RATE	ALD TIME	ALD RATE ALD TIME
SED	2.66	2.17	3.77

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	5.33	13.6

PLOT AREA HARVESTED 0.00046

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77/R/CS/198

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to aqueous urea/ammonium nitrate on the yield and nitrogen uptake of maize grown for forage - Long Hoos VI/VII 5.

Sponsors: J. Ashworth, A.J. Barnard.

The first year, forage maize.

Design: 3 randomised blocks of 10 plots split systematically into 2.

Whole plot dimensions: 4.57 x 9.14.

Treatments: All combinations of:-

Whole plots

1. N TREAT — Nitrogen forms and rates, and nitrification inhibitors:

Aqueous urea/ammonium nitrate injected to seedbed (13 May) at 120 kg N:-

AQ3 -	Alone
AQ3 STC1	With sodium trithiocarbonate at 10 kg
AQ3 STC2	With sodium trithiocarbonate at 25 kg
AQ3 NIT1	With nitrapyrin ('N-Serve') at 0.5 kg
AQ3 NIT2	With nitrapyrin at 1.0 kg

'Nitro-Chalk' applied to seedbed (20 May) (kg N):-

NC1	40
NC2	80
NC3	120
NC4	160

'Nitro-Chalk' dressing divided (kg N):-

NC1+1+1	40 to seedbed (20 May), 40 in July (29 July), 40 at tasselling (30 Aug)

Sub plots

2. POPULATN — Plant population:

100000
150000

Basal applications: Manures: (0:14:28) at 970 kg. Weedkiller: Atrazine at 1.7 kg in 220 l.

Seed: Caldera 535.

Cultivations, etc.:- Deep-tine cultivated: 13 Sept, 1976. PK applied: 13 Dec. Ploughed: 28 Feb, 1977. Spring-tine cultivated: 17 May. Sown: 18 May. Weedkiller applied: 20 June. Harvested by hand: 2 Dec. Previous crops: Oats 1975, wheat 1976.

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77/R/CS/198

NOTES: (1) Assessments of plant populations were made after emergence and at harvest.
(2) Estimates were made of numbers of plants infected by smut (Ustilago maydis) and stem rots (Fusarium spp.).
(3) Determinations of N percentage in crop dry matter were made.

FORAGE DRY MATTER TONNES/HECTARE

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

POPULATN / N TREAT	100000	150000	MEAN
AQ3 -	8.34	8.71	8.52
AQ3 STC1	7.98	8.86	8.42
AQ3 STC2	8.64	8.95	8.79
AQ3 NIT1	8.24	8.52	8.38
AQ3 NIT2	8.04	9.23	8.63
NC1	7.83	8.15	7.99
NC2	7.89	7.82	7.85
NC3	9.02	9.18	9.10
NC4	8.60	9.72	9.16
NC1+1+1	8.01	8.89	8.45
MEAN	8.26	8.80	8.53

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

TABLE	N TREAT	POPULATN	N TREAT POPULATN
SED	0.422	0.162	0.556
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N TREAT			0.512

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.517	6.1
BLOCK.WP.SP	20	0.626	7.3

MEAN DM% 24.3

SUB PLOT AREA HARVESTED 0.00059

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77/R/CS/200 and 77/W/CS/200

FACTORS AFFECTING YIELD

Object: To study some of the factors limiting yield of grass, clover and lucerne - Rothamsted (R), Pastures and Woburn (W), Butt Furlong.

Sponsors: J.M. Day, I.F. Henderson, J.F. Jenkyn, A.E. Johnston, B.J. Legg, J. McEwen, R.T. Plumb, R.J. Roughley, J.F. Witty.

The first year, ryegrass, white clover, lucerne.

Design: Single replicate of 2 plots split into 50. In the first year yields are taken from only 22 sub plots.

Whole plot dimensions: 23.8 x 24.5.

Treatments (for yields 1977): All combinations of:-

Whole plots

1.	IRRIGTN	Irrigation (basal 75 mm Pastures (R), 63 mm Butt Furlong (W) until 3rd trifoliate leaf stage of clover then treatment):
	PART	Irrigated to reduce a soil moisture deficit of 50 mm to 25 mm, 30 mm Pastures (R), 50 mm Butt Furlong (W)
	FULL	Irrigated to reduce a soil moisture deficit of 25 mm to nil, 55 mm Pastures (R), 75 mm Butt Furlong (W)

Sub plots

2.	VARIETY	Varieties and species:
	S23	S.23 ryegrass (duplicated)
	S23/BLAN	S.23 ryegrass + Blanca white clover (duplicated)
	BLAN	Blanca white clover (quadruplicated)
	VERTUS	Vertus lucerne (duplicated)
3.	PATHCONT	Pathogen control:
	NONE	None
	FULL	'Full' pathogen control

plus one extra sub plot treatment:

	EXTRA	
	S23/S100	S.23 ryegrass + S.100 white clover (duplicated)

NOTES: (1) Full pathogen control consisted of:- (1) Aldicarb at 10 kg, applied to the seedbed, (2) benomyl foliar spray at 0.5 kg + phorate at 5.0 kg applied as granules, applied after each cut.

(2) Irrigation was applied on the following dates:-

Pastures (R)

31 May	12.5 mm
7 July	12.5 mm
27 July	25 mm
31 July	25 mm
2 Aug	25 mm (IRRIGTN FULL plots only)
5 Aug	30 mm

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77/R/CS/200 and 77/W/CS/200

Butt Furlong (W)

1- 2 June	19 mm
1 July	19 mm
12-14 July	25 mm
22-26 July	25 mm (IRRIGTN PART plots), 50 mm (IRRIGTN FULL plots)
2- 3 Aug	25 mm

Standard applications:
Pastures (R) All plots: Manures: Ground chalk at 7.5 tonnes and (0:20:20) at 600 kg. S.23 plots only: 50 kg N as 'Nitro-Chalk' in the seedbed and 25 kg N as 'Nitro-Chalk' after the first two cuts.
Butt Furlong (W) All plots: Manures: (10:24:24) at 500 kg. S.23 plots only 25 kg N as 'Nitro-Chalk' after the first two cuts. Weedkiller: 2, 4-DB at 2.1 kg in 340 l.

Seed: S.23 Perennial ryegrass alone sown at 20 kg.
S.23 Perennial ryegrass sown at 10 kg either with Blanca white clover sown at 4 kg or with S.100 white clover at 4 kg.
Blanca white clover alone, sown at 4 kg.
Lucerne, Vertus, sown at 10 kg, inoculated with Rhizobium.

Cultivations, etc.:-
Pastures (R): Ground chalk applied: 1 Sept, 1976. Ploughed: 16 Sept. Heavy spring-tine cultivated twice: 7 Mar, 1977. PK applied: 13 May. Spring-tine cultivated, harrowed and rolled: 18 May. Seed sown, harrowed in: 20 May. Cut three times: 12 Aug, 12 Sept, 25 Oct. Previous crops: W. Wheat 1975, barley 1976.
Butt Furlong (W): Ploughed: 1 Nov, 1976. Spring-tine cultivated: 7 Mar, 1977. Spring-tine cultivated with crumbler attached four times: 8 Mar, 18 Apr, 25 Apr, 20 May. NPK applied: 25 Apr. Seeds sown, fine-tooth harrowed, rolled: 23 May. Weedkiller applied: 11 July. Hand weeded: 26-28 July. Cut three times: 16 Aug, 15 Sept, 18 Oct. Previous crops: Barley 1975, 1976.

NOTES: (1) Assessments of pests and diseases were made during the season. Nitrogen percentages of crop produce were measured.
(2) 77/W/CS/200
One plot with treatment combinations

IRRIGTN	FULL
VARIETY	VERTUS
PATHCONT	NONE

was affected by erosion early in the year, an estimated value was used in the analysis.

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77/R/CS/200 PASTURES (R)

1ST CUT (12/8/77) DRY MATTER TONNES/HECTARE

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

VARIETY IRRIGTN	S23	S23/BLAN	BLAN	VERTUS	MEAN
PART	2.23	1.36	1.25	2.48	1.71
FULL	2.35	1.80	1.44	1.83	1.77
MEAN	2.29	1.58	1.35	2.15	1.74

PATHCONT IRRIGTN	NONE	FULL	MEAN
PART	1.66	1.77	1.71
FULL	1.72	1.82	1.77
MEAN	1.69	1.79	1.74

PATHCONT VARIETY	NONE	FULL	MEAN
S23	2.40	2.18	2.29
S23/BLAN	1.33	1.83	1.58
BLAN	1.29	1.41	1.35
VERTUS	2.16	2.15	2.15
MEAN	1.69	1.79	1.74

IRRIGTN	PATHCONT VARIETY	NONE	FULL
PART	S23	2.39	2.08
	S23/BLAN	1.09	1.62
	BLAN	1.21	1.29
	VERTUS	2.40	2.56
FULL	S23	2.42	2.28
	S23/BLAN	1.56	2.03
	BLAN	1.36	1.53
	VERTUS	1.91	1.74

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	1.05	1.06	1.06

GRAND MEAN 1.68

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.195	0.124	0.277	0.175	MIN REP
	0.169		0.240		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.277	0.391	MIN REP
	0.240	0.339	MAX-MIN
	0.196	0.277	MAX REP

	VARIETY
MAX-MIN	BLAN V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER
MAX REP	WITHIN BLAN

* WITHIN SAME LEVEL OF IRRIGTN ONLY

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77/R/CS/200 PASTURES (R)

2ND CUT (12/9/77) ¢RY MATTER TONNES/HECTARE

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

VARIETY	S23	S23/BLAN	BLAN	VERTUS	MEAN
IRRIGTN					
PART	2.13	1.69	1.87	1.38	1.79
FULL	1.94	1.59	1.77	1.27	1.67
MEAN	2.03	1.64	1.82	1.33	1.73

PATHCONT	NONE	FULL	MEAN
IRRIGTN			
PART	1.77	1.81	1.79
FULL	1.59	1.74	1.67
MEAN	1.68	1.78	1.73

PATHCONT	NONE	FULL	MEAN
VARIETY			
S23	1.99	2.07	2.03
S23/BLAN	1.56	1.72	1.64
BLAN	1.75	1.89	1.82
VERTUS	1.34	1.32	1.33
MEAN	1.68	1.78	1.73

	PATHCONT	NONE	FULL
IRRIGTN	VARIETY		
PART	S23	2.11	2.14
	S23/BLAN	1.59	1.79
	BLAN	1.86	1.89
	VERTUS	1.40	1.36
FULL	S23	1.87	2.01
	S23/BLAN	1.52	1.65
	BLAN	1.64	1.89
	VERTUS	1.27	1.27

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	1.67	1.72	1.69

GRAND MEAN 1.72

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.077	0.049	0.109	0.069	MIN REP
	0.067		0.094		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.109	0.154	MIN REP
	0.094	0.133	MAX-MIN
	0.077	0.109	MAX REP

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77/R/CS/200 PASTURES (R)

3RD CUT (25/10/77) DRY MATTER TONNES/HECTARE

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

VARIETY IRRIGTN	S23	S23/BLAN	BLAN	VERTUS	MEAN
PART	1.49	1.07	0.83	0.21	0.89
FULL	1.59	1.06	0.85	0.22	0.91
MEAN	1.54	1.06	0.84	0.22	0.90

PATHCONT IRRIGTN	NONE	FULL	MEAN
PART	0.86	0.92	0.89
FULL	0.89	0.94	0.91
MEAN	0.87	0.93	0.90

PATHCONT VARIETY	NONE	FULL	MEAN
S23	1.56	1.51	1.54
S23/BLAN	1.01	1.11	1.06
BLAN	0.80	0.88	0.84
VERTUS	0.19	0.25	0.22
MEAN	0.87	0.93	0.90

IRRIGTN	PATHCONT VARIETY	NONE	FULL
PART	S23	1.54	1.43
	S23/BLAN	1.04	1.09
	BLAN	0.78	0.89
	VERTUS	0.15	0.28
FULL	S23	1.58	1.59
	S23/BLAN	0.98	1.13
	BLAN	0.83	0.88
	VERTUS	0.23	0.21

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	0.93	0.96	0.94

GRAND MEAN 0.90

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.053	0.033	0.075	0.047	MIN REP
	0.046		0.065		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.075	0.106	MIN REP
	0.065	0.091	MAX-MIN
	0.053	0.075	MAX REP

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77/R/CS/200 PASTURES (R)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

VARIETY	S23	S23/BLAN	BLAN	VERTUS	MEAN
IRRIGTN					
PART	5.85	4.11	3.96	4.08	4.39
FULL	5.87	4.44	4.06	3.32	4.35
MEAN	5.86	4.28	4.01	3.70	4.37

PATHCONT	NONE	FULL	MEAN
IRRIGTN			
PART	4.28	4.50	4.39
FULL	4.20	4.50	4.35
MEAN	4.24	4.50	4.37

PATHCONT	NONE	FULL	MEAN
VARIETY			
S23	5.96	5.77	5.86
S23/BLAN	3.89	4.66	4.28
BLAN	3.84	4.18	4.01
VERTUS	3.68	3.71	3.70
MEAN	4.24	4.50	4.37

	PATHCONT	NONE	FULL
IRRIGTN	VARIETY		
PART	S23	6.04	5.65
	S23/BLAN	3.73	4.50
	BLAN	3.85	4.07
	VERTUS	3.95	4.20
FULL	S23	5.87	5.88
	S23/BLAN	4.06	4.81
	BLAN	3.83	4.30
	VERTUS	3.41	3.22

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	3.65	3.74	3.70

GRAND MEAN 4.31

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.205	0.130	0.290	0.183	MIN REP
	0.178		0.251		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.190	0.410	MIN REP
	0.251	0.355	MAX-MIN
	0.205	0.290	MAX REP

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77/R/CS/200 PASTURES (R)

1ST CUT (12/8/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	26	0.391	23.3

1ST CUT MEAN DM% 13.2

2ND CUT (12/9/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	26	0.154	8.9

2ND CUT MEAN DM% 12.8

3RD CUT (25/10/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	26	0.106	11.7

3RD CUT MEAN DM% 12.6

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	26	0.410	9.5

TOTAL OF 3 CUTS MEAN DM% 12.9

SUB PLOT AREA HARVESTED 0.00038

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77/W/CS/200 BUTT FURLONG(W)

1ST CUT (16/8/77) DRY MATTER TONNES/HECTARE

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

VARIETY	S23	S23/BLAN	BLAN	VERTUS	MEAN
IRRIGTN					
PART	0.38	1.52	1.38	1.29	1.19
FULL	0.66	1.25	1.28	1.03	1.10
MEAN	0.52	1.38	1.33	1.16	1.14

PATHCONT	NONE	FULL	MEAN
IRRIGTN			
PART	1.16	1.22	1.19
FULL	0.89	1.31	1.10
MEAN	1.02	1.26	1.14

PATHCONT	NONE	FULL	MEAN
VARIETY			
S23	0.26	0.77	0.52
S23/BLAN	1.32	1.45	1.38
BLAN	1.18	1.48	1.33
VERTUS	1.18	1.14	1.16
MEAN	1.02	1.26	1.14

IRRIGTN	PATHCONT VARIETY	NONE	FULL
PART	S23	0.31	0.44
	S23/BLAN	1.45	1.59
	BLAN	1.25	1.51
	VERTUS	1.53	1.04
FULL	S23	0.21	1.10
	S23/BLAN	1.20	1.31
	BLAN	1.11	1.45
	VERTUS	0.82	1.25

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	0.92	0.94	0.93

GRAND MEAN 1.12

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.125	0.079	0.177	0.112	MIN REP
	0.108		0.153		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.177	0.250	MIN REP
	0.153	0.216	MAX-MIN
	0.125	0.177	MAX REP

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77/W/CS/200 BUTT FURLONG(W)

2ND CUT (15/9/77) DRY MATTER TONNES/HECTARE

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

VARIETY	S23	S23/BLAN	BLAN	VERTUS	MEAN
IRRIGTN					
PART	0.75	1.44	1.35	0.61	1.10
FULL	1.02	1.40	1.40	0.83	1.21
MEAN	0.88	1.42	1.37	0.72	1.15

PATHCONT	NONE	FULL	MEAN
IRRIGTN			
PART	1.10	1.10	1.10
FULL	1.06	1.36	1.21
MEAN	1.08	1.23	1.15

PATHCONT	NONE	FULL	MEAN
VARIETY			
S23	0.55	1.21	0.88
S23/BLAN	1.39	1.45	1.42
BLAN	1.33	1.42	1.37
VERTUS	0.78	0.66	0.72
MEAN	1.08	1.23	1.15

IRRIGTN	PATHCONT VARIETY	NONE	FULL
PART	S23	0.55	0.94
	S23/BLAN	1.49	1.40
	BLAN	1.38	1.31
	VERTUS	0.68	0.53
FULL	S23	0.55	1.48
	S23/BLAN	1.30	1.50
	BLAN	1.28	1.52
	VERTUS	0.88	0.78

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	1.21	1.27	1.24

GRAND MEAN 1.15

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.084	0.053	0.119	0.075	MIN REP
	0.073		0.103		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.119	0.169	MIN REP
	0.103	0.146	MAX-MIN
	0.084	0.119	MAX REP

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77/W/CS/200 BUTT FURLONG(W)

3RD CUT (18/10/77) DRY MATTER TONNES/HECTARE

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

VARIETY	S23	S23/BLAN	BLAN	VERTUS	MEAN
IRRIGTN					
PART	0.56	0.68	0.66	0.20	0.55
FULL	0.72	0.71	0.66	0.16	0.58
MEAN	0.64	0.69	0.66	0.18	0.57

PATHCONT	NONE	FULL	MEAN
IRRIGTN			
PART	0.46	0.64	0.55
FULL	0.50	0.66	0.58
MEAN	0.48	0.65	0.57

PATHCONT	NONE	FULL	MEAN
VARIETY			
S23	0.38	0.89	0.64
S23/BLAN	0.65	0.73	0.69
BLAN	0.61	0.71	0.66
VERTUS	0.17	0.19	0.18
MEAN	0.48	0.65	0.57

	PATHCONT	NONE	FULL
IRRIGTN	VARIETY		
PART	S23	0.36	0.76
	S23/BLAN	0.62	0.73
	BLAN	0.57	0.76
	VERTUS	0.20	0.20
FULL	S23	0.40	1.03
	S23/BLAN	0.68	0.73
	BLAN	0.65	0.67
	VERTUS	0.13	0.19

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	0.51	0.59	0.55

GRAND MEAN 0.56

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.041	0.026	0.058	0.037	MIN REP
	0.036		0.051		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.058	0.083	MIN REP
	0.051	0.073	MAX-MIN
	0.041	0.058	MAX REP

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77/W/CS/200 BUTT FURLONG(W)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

VARIETY IRRIGTN	S23	S23/BLAN	BLAN	VERTUS	MEAN
PART	1.68	3.64	3.39	2.09	2.84
FULL	2.39	3.36	3.34	2.02	2.89
MEAN	2.03	3.50	3.37	2.06	2.86

PATHCONT IRRIGTN	NONE	FULL	MEAN
PART	2.72	2.96	2.84
FULL	2.45	3.33	2.89
MEAN	2.59	3.14	2.86

PATHCONT VARIETY	NONE	FULL	MEAN
S23	1.19	2.88	2.03
S23/BLAN	3.37	3.63	3.50
BLAN	3.12	3.61	3.37
VERTUS	2.13	1.99	2.06
MEAN	2.59	3.14	2.86

IRRIGTN	PATHCONT VARIETY	NONE	FULL
PART	S23	1.22	2.14
	S23/BLAN	3.56	3.72
	BLAN	3.20	3.58
	VERTUS	2.42	1.77
FULL	S23	1.17	3.61
	S23/BLAN	3.18	3.54
	BLAN	3.04	3.65
	VERTUS	1.84	2.21

IRRIGTN	PART	FULL	MEAN
EXTRA S23/S100	2.64	2.81	2.72

GRAND MEAN 2.85

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

TABLE	VARIETY	PATHCONT	IRRIGTN* VARIETY	IRRIGTN* PATHCONT	
SED	0.207	0.131	0.293	0.185	MIN REP
	0.179		0.254		MAX-MIN

TABLE	VARIETY PATHCONT	IRRIGTN* VARIETY PATHCONT	
SED	0.293	0.414	MIN REP
	0.254	0.359	MAX-MIN
	0.207	0.293	MAX REP

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77/W/CS/200 BUTT FURLONG(W)

1ST CUT (16/8/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	25	0.250	22.2

1ST CUT MEAN DM% 12.7

2ND CUT (15/9/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	25	0.169	14.5

2ND CUT MEAN DM% 13.7

3RD CUT (18/10/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	25	0.083	14.6

3RD CUT MEAN DM% 15.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
WP.SP	25	0.414	14.5

TOTAL OF 3 CUTS MEAN DM% 14.0

SUB PLOT AREA HARVESTED 0.00038

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77/R/CS/201

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on pests, diseases, nitrogen fixation and yield of field beans - Pastures.

Sponsors: R. Bardner, G.G. Briggs, A.J. Cockbain, J.M. Day, K.E. Fletcher, B.J. Legg, J. McEwen, R.J. Roughley, G.A. Salt, H.R. Simpson, R.M. Webb, J.F. Witty.

The first year, field beans.

Design: Half replicate of 2^8 in 8 blocks of 2 plots split into 8.

Whole plot dimensions: 10.4 x 57.6.

Treatments: Combinations of:-

Whole plots

1.	IRRIGTN	Irrigation:
	NONE	None
	FULL	Full (119 mm)

Sub plots

2.	N	Nitrogen fertiliser at flowering (kg N):
	0	
	150	
3.	ALDICARB	Aldicarb to seedbed (kg):
	0	
	10	
4.	FONOFOS	Fonofos to seedbed (kg):
	0	
	5	
5.	BENOMYL(1)	Benomyl to seedbed (kg):
	0	
	32	
6.	PERMETH	Permethrin foliar spray (kg):
	0.00	0.00
	0.15	0.15 on 18 May and 21 June
7.	PIRIMICA	Pirimicarb foliar spray (kg)
	0.00	0.00
	0.14	0.14 on 9 June and 4 July

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8. BENOMYL(2)

	Benomyl foliar spray (kg):
0.0	0.0
0.6	0.6 on 4 July

NOTES: (1) Sprays were applied in 340 l.

(2) Irrigation treatments (mm water):

2 July	25
11 July	25
16 July	25
22 July	25
30 July	19
Total	119

(3) N at flowering was applied to half of the plots on 1 July and to the remainder on 5 July.

Basal applications: Manures: Chalk at 7.5 t. FYM at 20 t. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. FYM applied: 16 Sept. Ploughed: 17 Sept. Heavy spring-tine cultivated: 7 Mar, 1977. Spike rotary cultivated: 6 Apr. Seed sown: 7 Apr. Weedkiller applied: 15 Apr. Basal insecticide applied: 19 July. Combine harvested IRRIGTN NONE plots: 30 Sept. Combine harvested IRRIGTN FULL plots: 11 Oct. Previous crops: Wheat 1975, barley 1976.

NOTE: Plant counts were made after establishment and again before harvest. Total above-ground dry matter and nitrogen percentages were measured on three occasions. Components of yield were measured before harvest. Amounts of nodular material and nitrogenase activity were measured on two occasions. Ectoparasitic nematodes, root and foliar fungi, aphids, weevils and viruses were counted at intervals during the season. Amounts of aldicarb and benomyl in soil and plants were measured at intervals. Nitrogen percentages of grain were measured.

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GRAIN TONNES/HECTARE

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

ALDICARB	0	10	MEAN
N			
0	4.43	4.74	4.59
150	4.44	4.86	4.65
MEAN	4.44	4.80	4.62

FONOFOS	0	5	MEAN
N			
0	4.57	4.60	4.59
150	4.60	4.70	4.65
MEAN	4.59	4.65	4.62

FONOFOS	0	5	MEAN
ALDICARB			
0	4.37	4.51	4.44
10	4.80	4.80	4.80
MEAN	4.59	4.65	4.62

BENOMYL(1)	0	32	MEAN
N			
0	4.52	4.65	4.59
150	4.63	4.68	4.65
MEAN	4.57	4.67	4.62

BENOMYL(1)	0	32	MEAN
ALDICARB			
0	4.34	4.53	4.44
10	4.80	4.80	4.80
MEAN	4.57	4.67	4.62

BENOMYL(1)	0	32	MEAN
FONOFOS			
0	4.62	4.55	4.59
5	4.52	4.79	4.65
MEAN	4.57	4.67	4.62

PERMETH	0.00	0.15	MEAN
N			
0	4.52	4.65	4.59
150	4.55	4.75	4.65
MEAN	4.54	4.70	4.62

PERMETH	0.00	0.15	MEAN
ALDICARB			
0	4.28	4.60	4.44
10	4.80	4.80	4.80
MEAN	4.54	4.70	4.62

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GRAIN TONNES/HECTARE

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

PERMETH	0.00	0.15	MEAN
FONOFOS			
0	4.50	4.67	4.59
5	4.57	4.73	4.65
MEAN	4.54	4.70	4.62

PERMETH	0.00	0.15	MEAN
BENOMYL(1)			
0	4.48	4.66	4.57
32	4.60	4.74	4.67
MEAN	4.54	4.70	4.62

PIRIMICA	0.00	0.14	MEAN
N			
0	4.55	4.62	4.59
150	4.61	4.70	4.65
MEAN	4.58	4.66	4.62

PIRIMICA	0.00	0.14	MEAN
ALDICARB			
0	4.38	4.50	4.44
10	4.78	4.82	4.80
MEAN	4.58	4.66	4.62

PIRIMICA	0.00	0.14	MEAN
FONOFOS			
0	4.54	4.63	4.59
5	4.62	4.68	4.65
MEAN	4.58	4.66	4.62

PIRIMICA	0.00	0.14	MEAN
BENOMYL(1)			
0	4.50	4.64	4.57
32	4.66	4.67	4.67
MEAN	4.58	4.66	4.62

PIRIMICA	0.00	0.14	MEAN
PERMETH			
0.00	4.46	4.62	4.54
0.15	4.70	4.69	4.70
MEAN	4.58	4.66	4.62

BENOMYL(2)	0.0	0.6	MEAN
N			
0	4.44	4.73	4.59
150	4.49	4.81	4.65
MEAN	4.47	4.77	4.62

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GRAIN TONNES/HECTARE

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

BENOMYL(2)	0.0	0.6	MEAN
ALDICARB			
0	4.27	4.60	4.44
10	4.66	4.94	4.80
MEAN	4.47	4.77	4.62

BENOMYL(2)	0.0	0.6	MEAN
FONOFOS			
0	4.46	4.71	4.59
5	4.47	4.84	4.65
MEAN	4.47	4.77	4.62

BENOMYL(2)	0.0	0.6	MEAN
BENOMYL(1)			
0	4.39	4.75	4.57
32	4.54	4.79	4.67
MEAN	4.47	4.77	4.62

BENOMYL(2)	0.0	0.6	MEAN
PERMETH			
0.00	4.41	4.67	4.54
0.15	4.53	4.87	4.70
MEAN	4.47	4.77	4.62

BENOMYL(2)	0.0	0.6	MEAN
PIRIMICA			
0.00	4.47	4.69	4.58
0.14	4.46	4.86	4.66
MEAN	4.47	4.77	4.62

ALDICARB	0		10	
FONOFOS	0	5	0	5
N				
0	4.35	4.52	4.79	4.69
150	4.39	4.50	4.82	4.90

ALDICARB	0		10	
BENOMYL(1)	0	32	0	32
N				
0	4.34	4.53	4.69	4.78
150	4.34	4.54	4.91	4.82

FONOFOS	0		5	
BENOMYL(1)	0	32	0	32
N				
0	4.57	4.56	4.46	4.74
150	4.68	4.53	4.58	4.83

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GRAIN TONNES/HECTARE

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

FONOFOS	0		5	
BENOMYL(1)	0	32	0	32
ALDICARB				
0	4.40	4.34	4.29	4.73
10	4.85	4.75	4.75	4.84

ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
N				
0	4.32	4.55	4.73	4.74
150	4.24	4.65	4.87	4.86

FONOFOS	0		5	
PERMETH	0.00	0.15	0.00	0.15
N				
0	4.49	4.64	4.56	4.65
150	4.52	4.69	4.59	4.82

FONOFOS	0		5	
PERMETH	0.00	0.15	0.00	0.15
ALDICARB				
0	4.19	4.54	4.37	4.66
10	4.81	4.79	4.78	4.81

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
N				
0	4.56	4.48	4.49	4.81
150	4.41	4.85	4.70	4.66

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
ALDICARB				
0	4.18	4.50	4.37	4.69
10	4.78	4.82	4.82	4.78

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
FONOFOS				
0	4.53	4.72	4.48	4.61
5	4.44	4.60	4.71	4.86

ALDICARB	0		10	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	4.35	4.52	4.76	4.71
150	4.42	4.47	4.80	4.92

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GRAIN TONNES/HECTARE

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

FONOFOS	0		5	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	4.52	4.62	4.59	4.62
150	4.57	4.64	4.65	4.75

FONOFOS	0		5	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	4.31	4.42	4.45	4.57
10	4.77	4.84	4.79	4.80

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	4.46	4.58	4.65	4.65
150	4.54	4.71	4.67	4.69

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	4.28	4.40	4.48	4.59
10	4.72	4.88	4.84	4.75

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
FONOFOS				
0	4.53	4.72	4.55	4.54
5	4.48	4.57	4.77	4.80

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	4.47	4.58	4.63	4.66
150	4.44	4.66	4.77	4.73

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	4.15	4.40	4.61	4.59
10	4.76	4.83	4.80	4.80

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
FONOFOS				
0	4.43	4.58	4.65	4.68
5	4.49	4.66	4.75	4.71

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GRAIN TONNES/HECTARE

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

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
BENOMYL(1)				
0	4.33	4.64	4.67	4.65
32	4.59	4.60	4.73	4.74

ALDICARB	0		10	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	4.27	4.60	4.61	4.86
150	4.28	4.61	4.71	5.02

FONOFOS	0		5	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	4.45	4.68	4.43	4.78
150	4.47	4.73	4.51	4.89

FONOFOS	0		5	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	4.24	4.50	4.31	4.71
10	4.68	4.92	4.63	4.96

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	4.31	4.73	4.57	4.74
150	4.47	4.78	4.51	4.85

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	4.13	4.56	4.42	4.65
10	4.65	4.95	4.66	4.93

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	4.46	4.79	4.46	4.63
5	4.32	4.72	4.62	4.95

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	4.38	4.67	4.49	4.80
150	4.43	4.68	4.56	4.95

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GRAIN TONNES/HECTARE

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

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	4.20	4.36	4.35	4.85
10	4.62	4.98	4.70	4.90

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	4.47	4.54	4.46	4.88
5	4.35	4.80	4.59	4.87

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
BENOMYL(1)				
0	4.34	4.62	4.44	4.88
32	4.47	4.72	4.61	4.86

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	4.49	4.62	4.39	4.84
150	4.46	4.76	4.53	4.87

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	4.30	4.47	4.25	4.74
10	4.65	4.91	4.67	4.97

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	4.39	4.69	4.53	4.73
5	4.55	4.69	4.39	4.98

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
BENOMYL(1)				
0	4.44	4.56	4.34	4.95
32	4.50	4.82	4.58	4.76

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
PERMETH				
0.00	4.43	4.49	4.38	4.86
0.15	4.52	4.89	4.53	4.85

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GRAIN TONNES/HECTARE

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

TABLE	N	ALDICARB	FONOFOS	BENOMYL(1)
SED	0.060	0.060	0.060	0.060

TABLE	PERMETH	PIRIMICA	BENOMYL(2)	N ALDICARB
SED	0.060	0.060	0.060	0.085

TABLE	N FONOFOS	ALDICARB FONOFOS	N BENOMYL(1)	ALDICARB BENOMYL(1)
SED	0.085	0.085	0.085	0.085

TABLE	FONOFOS BENOMYL(1)	N PERMETH	ALDICARB PERMETH	FONOFOS PERMETH
SED	0.085	0.085	0.085	0.085

TABLE	BENOMYL(1) PERMETH	N PIRIMICA	ALDICARB PIRIMICA	FONOFOS PIRIMICA
SED	0.085	0.085	0.085	0.085

TABLE	BENOMYL(1) PIRIMICA	PERMETH PIRIMICA	N BENOMYL(2)	ALDICARB BENOMYL(2)
SED	0.085	0.085	0.085	0.085

TABLE	FONOFOS BENOMYL(2)	BENOMYL(1) BENOMYL(2)	PERMETH BENOMYL(2)	PIRIMICA BENOMYL(2)
SED	0.085	0.085	0.085	0.085

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	28	0.239	5.2

NOTE STANDARD ERRORS ARE ESTIMATED FROM 3 FACTOR AND HIGHER INTERACTIONS AND CONSEQUENTLY ARE NOT GIVEN FOR 3 WAY TABLES.

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00293

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77/R/CS/201 IRRIGATED PLOTS ONLY

GRAIN TONNES/HECTARE

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

ALDICARB	0	10	MEAN
N			
0	3.47	3.60	3.54
150	3.22	3.74	3.48
MEAN	3.35	3.67	3.51

FONOFOS	0	5	MEAN
N			
0	3.56	3.51	3.54
150	3.49	3.47	3.48
MEAN	3.53	3.49	3.51

FONOFOS	0	5	MEAN
ALDICARB			
0	3.37	3.32	3.35
10	3.68	3.66	3.67
MEAN	3.53	3.49	3.51

BENOMYL(1)	0	32	MEAN
N			
0	3.43	3.64	3.54
150	3.34	3.62	3.48
MEAN	3.39	3.63	3.51

BENOMYL(1)	0	32	MEAN
ALDICARB			
0	3.30	3.40	3.35
10	3.48	3.86	3.67
MEAN	3.39	3.63	3.51

BENOMYL(1)	0	32	MEAN
FONOFOS			
0	3.43	3.62	3.53
5	3.34	3.64	3.49
MEAN	3.39	3.63	3.51

PERMETH	0.00	0.15	MEAN
N			
0	3.54	3.54	3.54
150	3.43	3.53	3.48
MEAN	3.48	3.53	3.51

PERMETH	0.00	0.15	MEAN
ALDICARB			
0	3.24	3.46	3.35
10	3.73	3.60	3.67
MEAN	3.48	3.53	3.51

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GRAIN TONNES/HECTARE

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

PERMETH FONOFOS	0.00	0.15	MEAN
0	3.52	3.53	3.53
5	3.45	3.53	3.49
MEAN	3.48	3.53	3.51

PERMETH BENOMYL(1)	0.00	0.15	MEAN
0	3.31	3.46	3.39
32	3.65	3.61	3.63
MEAN	3.48	3.53	3.51

PIRIMICA N	0.00	0.14	MEAN
0	3.51	3.56	3.54
150	3.39	3.57	3.48
MEAN	3.45	3.57	3.51

PIRIMICA ALDICARB	0.00	0.14	MEAN
0	3.28	3.42	3.35
10	3.62	3.72	3.67
MEAN	3.45	3.57	3.51

PIRIMICA FONOFOS	0.00	0.14	MEAN
0	3.47	3.58	3.53
5	3.43	3.55	3.49
MEAN	3.45	3.57	3.51

PIRIMICA BENOMYL(1)	0.00	0.14	MEAN
0	3.32	3.45	3.39
32	3.58	3.69	3.63
MEAN	3.45	3.57	3.51

PIRIMICA PERMETH	0.00	0.14	MEAN
0.00	3.29	3.67	3.48
0.15	3.60	3.46	3.53
MEAN	3.45	3.57	3.51

BENOMYL(2) N	0.0	0.6	MEAN
0	3.42	3.65	3.54
150	3.36	3.60	3.48
MEAN	3.39	3.63	3.51

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GRAIN TONNES/HECTARE

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

BENOMYL(2) ALDICARB	0.0	0.6	MEAN
0	3.22	3.48	3.35
10	3.57	3.77	3.67
MEAN	3.39	3.63	3.51

BENOMYL(2) FONOFOS	0.0	0.6	MEAN
0	3.44	3.61	3.53
5	3.34	3.64	3.49
MEAN	3.39	3.63	3.51

BENOMYL(2) BENOMYL(1)	0.0	0.6	MEAN
0	3.25	3.52	3.39
32	3.53	3.73	3.63
MEAN	3.39	3.63	3.51

BENOMYL(2) PERMETH	0.0	0.6	MEAN
0.00	3.35	3.62	3.48
0.15	3.43	3.63	3.53
MEAN	3.39	3.63	3.51

BENOMYL(2) PIRIMICA	0.0	0.6	MEAN
0.00	3.26	3.63	3.45
0.14	3.52	3.62	3.57
MEAN	3.39	3.63	3.51

ALDICARB	0		10	
FONOFOS	0	5	0	5
N				
0	3.50	3.44	3.62	3.58
150	3.24	3.21	3.74	3.73

ALDICARB	0		10	
BENOMYL(1)	0	32	0	32
N				
0	3.44	3.51	3.42	3.78
150	3.16	3.29	3.53	3.94

FONOFOS	0		5	
BENOMYL(1)	0	32	0	32
N				
0	3.42	3.70	3.43	3.59
150	3.44	3.54	3.25	3.69

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GRAIN TONNES/HECTARE

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

FONOFOS	0		5	
BENOMYL(1)	0	32	0	32
ALDICARB				
0	3.37	3.38	3.23	3.42
10	3.50	3.86	3.45	3.86

ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
N				
0	3.30	3.65	3.78	3.42
150	3.17	3.27	3.69	3.79

FONOFOS	0		5	
PERMETH	0.00	0.15	0.00	0.15
N				
0	3.51	3.61	3.56	3.46
150	3.53	3.46	3.33	3.60

FONOFOS	0		5	
PERMETH	0.00	0.15	0.00	0.15
ALDICARB				
0	3.33	3.42	3.14	3.50
10	3.71	3.65	3.75	3.56

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
N				
0	3.09	3.76	3.98	3.31
150	3.53	3.15	3.33	3.91

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
ALDICARB				
0	3.04	3.55	3.43	3.37
10	3.59	3.36	3.88	3.84

BENOMYL(1)	0		32	
PERMETH	0.00	0.15	0.00	0.15
FONOFOS				
0	3.40	3.46	3.63	3.61
5	3.22	3.45	3.67	3.61

ALDICARB	0		10	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	3.46	3.48	3.56	3.64
150	3.09	3.36	3.68	3.79

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GRAIN TONNES/HECTARE

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

FONOFOS	0		5	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	3.64	3.48	3.38	3.65
150	3.30	3.68	3.48	3.46

FONOFOS	0		5	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	3.29	3.46	3.27	3.38
10	3.66	3.70	3.58	3.73

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	3.41	3.45	3.61	3.68
150	3.24	3.45	3.54	3.70

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	3.15	3.45	3.41	3.39
10	3.50	3.45	3.74	3.98

BENOMYL(1)	0		32	
PIRIMICA	0.00	0.14	0.00	0.14
FONOFOS				
0	3.30	3.56	3.64	3.60
5	3.34	3.34	3.51	3.77

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
N				
0	3.38	3.69	3.64	3.44
150	3.20	3.66	3.57	3.49

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
ALDICARB				
0	2.89	3.58	3.67	3.26
10	3.70	3.77	3.54	3.67

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
FONOFOS				
0	3.35	3.69	3.60	3.47
5	3.24	3.66	3.61	3.45

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GRAIN TONNES/HECTARE

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

PERMETH	0.00		0.15	
PIRIMICA	0.00	0.14	0.00	0.14
BENOMYL(1)				
0	3.04	3.59	3.60	3.31
32	3.55	3.76	3.60	3.61

ALDICARB	0		10	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	3.25	3.69	3.59	3.60
150	3.18	3.27	3.54	3.94

FONOFOS	0		5	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	3.47	3.65	3.38	3.64
150	3.41	3.57	3.31	3.63

FONOFOS	0		5	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	3.28	3.47	3.16	3.49
10	3.60	3.76	3.53	3.78

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	3.38	3.48	3.47	3.82
150	3.13	3.55	3.58	3.65

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	3.14	3.46	3.30	3.50
10	3.37	3.58	3.76	3.96

BENOMYL(1)	0		32	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	3.38	3.49	3.50	3.74
5	3.13	3.54	3.55	3.73

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	3.37	3.70	3.48	3.60
150	3.33	3.53	3.39	3.67

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77/R/CS/201 IRRIGATED PLOTS ONLY

GRAIN TONNES/HECTARE

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

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	3.08	3.39	3.35	3.57
10	3.62	3.85	3.52	3.69

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	3.22	3.81	3.66	3.41
5	3.48	3.42	3.21	3.85

PERMETH	0.00		0.15	
BENOMYL(2)	0.0	0.6	0.0	0.6
BENOMYL(1)				
0	3.21	3.42	3.30	3.62
32	3.48	3.82	3.57	3.65

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
N				
0	3.38	3.64	3.47	3.66
150	3.15	3.62	3.57	3.58

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
ALDICARB				
0	3.14	3.41	3.29	3.55
10	3.39	3.85	3.75	3.69

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
FONOFOS				
0	3.28	3.66	3.59	3.57
5	3.25	3.61	3.44	3.67

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
BENOMYL(1)				
0	3.24	3.41	3.27	3.63
32	3.29	3.86	3.77	3.61

PIRIMICA	0.00		0.14	
BENOMYL(2)	0.0	0.6	0.0	0.6
PERMETH				
0.00	3.11	3.48	3.59	3.76
0.15	3.42	3.79	3.45	3.48

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GRAIN TONNES/HECTARE

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

TABLE	N	ALDICARB	FONOFOS	BENOMYL(1)
SED	0.097	0.097	0.097	0.097

TABLE	PERMETH	PIRIMICA	BENOMYL(2)	N ALDICARB
SED	0.097	0.097	0.097	0.137

TABLE	N FONOFOS	ALDICARB FONOFOS	N BENOMYL(1)	ALDICARB BENOMYL(1)
SED	0.137	0.137	0.137	0.137

TABLE	FONOFOS BENOMYL(1)	N PERMETH	ALDICARB PERMETH	FONOFOS PERMETH
SED	0.137	0.137	0.137	0.137

TABLE	BENOMYL(1) PERMETH	N PIRIMICA	ALDICARB PIRIMICA	FONOFOS PIRIMICA
SED	0.137	0.137	0.137	0.137

TABLE	BENOMYL(1) PIRIMICA	PERMETH PIRIMICA	N BENOMYL(2)	ALDICARB BENOMYL(2)
SED	0.137	0.137	0.137	0.137

TABLE	FONOFOS BENOMYL(2)	BENOMYL(1) BENOMYL(2)	PERMETH BENOMYL(2)	PIRIMICA BENOMYL(2)
SED	0.137	0.137	0.137	0.137

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	28	0.388	11.0

NOTE STANDARD ERRORS ARE ESTIMATED FROM 3 FACTOR AND HIGHER INTERACTIONS AND CONSEQUENTLY ARE NOT GIVEN FOR 3 WAY TABLES.

GRAIN MEAN DM% 68.2

SUB PLOT AREA HARVESTED 0.00293

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77/R/CS/202

EFFECTS OF PHIALOPHORA

Object: To study the effects of ryegrass, oats and wheat, and of soil inoculation on populations of Phialophora radicicola graminicola (Prg) and on take-all (Gauemannomyces graminis) and yield of following wheat crops - Whittlocks.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The first year, ryegrass, oats, wheat.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.67 x 6.10.

Treatments:

CRP INOC	Crop and inoculation:
GRASS	Ryegrass
GRASS I	Ryegrass + Prg inoculum
OATS	Spring oats (triplicated)
OATS I	Spring oats + Prg inoculum
WHEAT	Spring wheat
WHEAT I	Spring wheat + Prg inoculum

NOTES: (1) Yields were not taken from ryegrass.
(2) Agar cultures of Phialophora radicicola graminicola macerated in sand were broadcast on I plots, before power harrowing, on 12 Apr, 1977.
(3) Persistent wet weather delayed the sowing of ryegrass.
(4) The site chosen had already been sown to winter oats in autumn 1976. This crop was destroyed in early spring 1977.

Basal applications: Manures: All crops: (10:24:24) at 250 kg, combine drilled with winter oats. 'Nitro-Chalk' at 300 kg, combine drilled with the spring oats and wheat.

Seed: Ryegrass: RVP, sown at 22 kg.
Oats: Manod, sown at 200 kg.
Wheat: Sappo, sown at 190 kg.

Cultivations, etc.:- Winter oats sown: 20 Nov, 1976. Ploughed: 3 Mar, 1977. rolled: 4 Apr. All plots power harrowed and spring-tine cultivated: 7 Apr. All plots power harrowed: 12 Apr. Spring oats and wheat sown: 13 Apr. N applied to ryegrass plots: 2 May. Ryegrass plots power harrowed and sown: 27 May. Oats combine harvested: 10 Sept. Wheat combine harvested: 16 Sept. Grass cut: 21 Sept. Previous crops: Wheat 1975, barley 1976, oats autumn 1976 - spring 1977.

NOTE: Soils were bio-assayed for Phialophora in March and August. Wheat and oats were sampled in July, ryegrass in August to assess take-all and Phialophora.

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77/R/CS/202

GRAIN TONNES/HECTARE

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

CRP INOC	OATS	OATS I	WHEAT	WHEAT I	MEAN
	3.72	3.76	4.39	4.15	3.91

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

TABLE	CRP INOC	
SED	0.380	MIN REP
	0.310	MAX-MIN

	CRP INOC
MAX-MIN	OATS V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.465	11.9

GRAIN MEAN DM% 82.6

PLOT AREA HARVESTED 0.00119

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77/R/CS/204

CLOVER VARIETIES IN GRASS/CLOVER MIXTURES

Object: To study the effects of controlling pests and diseases on the persistence of different varieties of white clover in mixed grass/clover swards - Long Hoos IV 2.

Sponsors: I.F. Henderson, R.T. Plumb, J.F. Jenkyn.

The first year, white clover, ryegrass.

Design: 2 randomised blocks of 40 plots.

Whole plot dimensions: 1.83 x 6.10.

Treatments: All combinations of:-

1. VARIETY — Varieties and species:

S23	S.23 ryegrass
S23/BLAN	S.23 ryegrass + Blanca white clover
S23/KWW	S.23 ryegrass + Kent wild white clover
S23/LAD	S.23 ryegrass + Ladino white clover
S23/MIL	S.23 ryegrass + Milkanova white clover

2. CHEMICAL — Chemicals for pest and disease control:

NONE	None
ALDICARB	Aldicarb at 5 kg
BENOMYL	Benomyl at 0.5 kg
PHOR+MET	Phorate at 5 kg + metaldehyde at 1.8 kg

NOTES: (1) Aldicarb was applied on 20 May, 1977, 9 Sept.
(2) Benomyl was applied on 23 Sept.
(3) Phorate and metaldehyde were applied on 20 May, 4 Aug and 16 Sept.
(4) All treatment combinations were duplicated within blocks. Duplicates will be used for a test of nitrogen fertiliser in 1978.

Basal applications: Manures: (0:14:28) at 970 kg. 'Nitro-Chalk' at 100 kg.
Weedkillers: Paraquat at 0.56 kg ion in 340 l. 2,4-DB at 1.7 kg in 340 l.
Irrigation: 25 mm.

Seed: All varieties sown at 5 kg.

Cultivations, etc.:- Deep-tine cultivated: 13 Sept, 1976. Ploughed: 13 Oct. PK applied: 9 Nov. Paraquat applied: 2 May, 1977. Spring-tine cultivated: 10 May. Power harrowed: 11 May. Seed sown, hand raked, rolled: 20 May. 12.5 mm irrigation applied on two occasions: 24 May, 4 June. 2,4-DB applied: 15 July. Topped: 23 Aug. 'Nitro-Chalk' applied: 1 Sept. Cut: 14 Oct. Previous crops: Spring wheat, barley and oats, 1975, spring wheat 1976.

NOTES: (1) Tiller counts were made in September.
(2) The botanical composition of the first cut was examined.

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77/R/CS/204

1ST AND ONLY CUT (14/10/77) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	1.31	0.87	0.93	1.34	1.12
S23/BLAN	2.31	2.18	2.34	2.12	2.24
S23/KWW	2.23	2.25	2.44	2.17	2.27
S23/LAD	1.74	1.97	1.77	2.12	1.90
S23/MIL	2.06	2.45	2.23	2.25	2.25
MEAN	1.93	1.94	1.94	2.00	1.95

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

TABLE	VARIETY	CHEMICAL	VARIETY CHEMICAL
SED	0.101	0.090	0.201

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

STRATUM	DF	SE	CV%
BLOCK.WP	59	0.285	14.6

MEAN DM% 15.4

PLOT AREA HARVESTED 0.00054

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77/R/CS/205

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to forms of liquid nitrogen fertilisers on nitrogen uptake and yield - West Barnfield II.

Sponsors: F.V. Widdowson, A. Penny, J. Ashworth.

The first year, kale.

Design: 3 randomised blocks of 24 plots.

Whole plot dimensions: 4.27 x 8.53.

Treatments: All combinations of:-

1. L N FORM		Forms of liquid nitrogen fertiliser:
	AN+UR	Ammonium nitrate + urea (26% N)
	UR	Urea (19% N)
2. L N RATE		Rates of nitrogen fertiliser (kg N):
	100	
	200	
3. NI INHIB		Nitrification inhibitors added to liquid nitrogen fertiliser:
	NONE	None
	NITRAPYR	Nitrapyrin ('N-Serve') at 1 kg
	SOD TRI	Sodium trithiocarbonate at 22 kg

plus twelve extra treatments given solid nitrogen fertiliser (kg N):

SOLID N	
BSL 100S	BSL (a urea condensation product) at 100 to seedbed
BSL 200S	BSL at 200 to seedbed
NC 50S	'Nitro-Chalk' at 50 to seedbed
NC 100S	'Nitro-Chalk' at 100 to seedbed
NC 100DE	'Nitro-Chalk' at 100 divided equally between seedbed and top dressing
NC 100DU	'Nitro-Chalk' at 100 divided unequally, one-quarter to seedbed, three-quarters top dressed
NC 150S	'Nitro-Chalk' at 150 to seedbed
NC 200S	'Nitro-Chalk' at 200 to seedbed
NC 200DE	'Nitro-Chalk' at 200 divided equally between seedbed and top dressing
NC 200DU	'Nitro-Chalk' at 200 divided unequally, one-quarter to seedbed, three-quarters top dressed
NC 250S	'Nitro-Chalk' at 250 to seedbed
NC 300S	'Nitro-Chalk' at 300 to seedbed

NOTES: (1) 'Nitro-Chalk' and BSL applied to seedbed: 19 Apr, 1977.
(2) 'Nitro-Chalk' top dressed: 8 July.
(3) Liquid nitrogen fertiliser injected, 10 cm deep with tines 30 cm apart, on 19 Apr.

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Basal applications: Manures: (0:20:20) at 1260 kg. Chalk at 7.5 t. Weedkiller: Desmetryne at 0.42 kg in 220 l.

Seed: Maris Kestrel, sown at 1.7 kg.

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. Ploughed: 13 Sept. PK applied: 8 Apr, 1977. Spring-tine cultivated: 2 May. Power harrowed: 17 May. Sown: 18 May. Weedkiller applied: 8 July. Harvested by hand: 21 Nov. Previous crops: Barley 1975, wheat 1976.

NOTE: Crop samples were taken for N determinations.

FRESH WEIGHT TONNES/HECTARE

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

L N RATE	100	200	MEAN
L N FORM			
AN+UR	70.4	77.6	74.0
UR	66.1	75.2	70.6
MEAN	68.2	76.4	72.3

NI INHIB	NONE	NITRAPYR	SOD TRI	MEAN
L N FORM				
AN+UR	74.4	73.7	73.9	74.0
UR	71.7	70.0	70.1	70.6
MEAN	73.0	71.8	72.0	72.3

NI INHIB	NONE	NITRAPYR	SOD TRI	MEAN
L N RATE				
100	68.3	68.4	68.0	68.2
200	77.8	75.3	76.1	76.4
MEAN	73.0	71.8	72.0	72.3

L N RATE	100			200		
NI INHIB	NONE	NITRAPYR	SOD TRI	NONE	NITRAPYR	SOD TRI
L N FORM						
AN+UR	71.2	70.4	69.5	77.6	76.9	78.3
UR	65.4	66.4	66.4	78.0	73.6	73.9

SOLID N	
BSL 100S	69.2
BSL 200S	71.2
NC 50S	64.2
NC 100S	77.2
NC 100DE	66.2
NC 100DU	69.6
NC 150S	73.5
NC 200S	72.9
NC 200DE	77.7
NC 200DU	74.9
NC 250S	80.6
NC 300S	80.1
MEAN	73.1

GRAND MEAN 72.7

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FRESH WEIGHT TONNES/HECTARE

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

TABLE	SOLID N	L N FORM	L N RATE	NI INHIB
SED	3.03	1.24	1.24	1.52

TABLE	L N FORM L N RATE	L N FORM NI INHIB	L N RATE NI INHIB	L N FORM L N RATE NI INHIB
SED	1.75	2.14	2.14	3.03

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

STRATUM	DF	SE	CV%
BLOCK.WP	46	3.71	5.1

PLOT AREA HARVESTED 0.00114

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LATE N

Object: To study the effects of a range of fertilisers which release nitrogen later in the growing season than traditional forms on the growth, nitrogen uptake and yield of potatoes - Great Knott II.

Sponsors: T.M. Addiscott, J. Ashworth, A. Penny, F.V. Widdowson.

The first year, potatoes.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 13.1.

Treatments: All combinations of:-

1. N FORM — Forms of nitrogen fertiliser:

AA	Aqueous ammonia, injected before planting
AA+NITRA	Aqueous ammonia + nitrapyrin ('N-Serve') at 1 kg, injected before planting
AA+STC	Aqueous ammonia + sodium trithiocarbonate at 42 kg injected before planting
IB SMALL	IBDU (isobutylidene diurea), small granules to seedbed
IB LARGE	IBDU, large granules to seedbed
AN E+L	Ammonium nitrate, half in seedbed, half top-dressed
AN E	Ammonium nitrate, all in seedbed

2. N RATE(1) — Rates of nitrogen fertiliser (kg N):

200
300

plus four extra treatments given ammonium nitrate, all in the seedbed (kg N):

N RATE(2)

AN E 150
AN E 250
AN E 350
AN E 400

NOTES: (1) The intended rate of sodium trithiocarbonate was 24 kg. Only one plot, treatment N RATE(1)200, received this rate, all other plots received 42 kg.
(2) Aqueous ammonia and inhibitors were injected, 10 cm deep with tines 30 cm apart, on 21 Apr, 1977.
(3) Seedbed ammonium nitrate and IBDU were applied on 22 Apr.
(4) Top dressed ammonium nitrate was applied on 1 July.

Basal applications: Manures: (0:14:28) at 1880 kg. Weedkiller: Linuron at 1.4 kg in 340 l. Fungicide: Mancozeb at 1.3 kg in 340 l on three occasions. Insecticide: Pirimicarb at 0.14 kg applied with the last two fungicide sprays.

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Seed: Pentland Crown.

Cultivations, etc.:- Ploughed: 15-28 Sept, 1976. Spring-tine cultivated: 31 Mar, 1977. PK applied, spring-tine cultivated: 20 Apr. Spike rotary cultivated and potatoes planted: 25 Apr. Grubbed twice: 18 May, 23 June. Rotary ridged twice: 24 May, 27 June. Ridges rolled: 26 May. Weedkiller applied: 31 May. Fungicide applied: 5 July. Fungicide with insecticide applied: 26 July, 11 Aug. Haulm mechanically destroyed: 19 Oct. Lifted: 1 Nov. Previous crops: Barley 1975, winter oats 1976.

NOTE: Crop samples were taken for N determinations.

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TOTAL TUBERS TONNES/HECTARE

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

N RATE(1) / N FORM	200	300	MEAN
AA	43.9	44.9	44.4
AA+NITRA	46.9	48.7	47.8
AA+STC	46.6	47.1	46.9
IB SMALL	44.9	44.8	44.8
IB LARGE	42.1	45.3	43.7
AN E+L	43.2	45.4	44.3
AN E	44.3	45.3	44.8
MEAN	44.6	45.9	45.2

N RATE(2)	AN E 150	AN E 250	AN E 350	AN E 400	MEAN
	41.9	44.5	43.8	44.8	43.7

GRAND MEAN 44.9

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

TABLE	N RATE(2)	N FORM	N RATE(1)	N FORM N RATE(1)
SED	2.26	1.60	0.85	2.26

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	2.77	6.2

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PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

N RATE(1) / N FORM	200	300	MEAN
AA	88.7	87.4	88.1
AA+NITRA	87.4	87.0	87.2
AA+STC	87.0	87.2	87.1
IB SMALL	87.7	89.1	88.4
IB LARGE	87.1	88.5	87.8
AN E+L	89.6	86.8	88.2
AN E	88.0	88.0	88.0
MEAN	87.9	87.7	87.8

N RATE(2)	AN E 150	AN E 250	AN E 350	AN E 400	MEAN
	88.7	89.5	91.0	89.7	89.7

GRAND MEAN 88.2

PLOT AREA HARVESTED 0.00260

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VARIETIES, N AND CCC

Object: To study the effects of varieties, fungicides, and rates and times of applying nitrogen fertiliser on the incidence of foliar diseases and on yield of barley - Saxmundham, Oldershaw's and Garner's plots.

Sponsors: F.V. Widdowson, A.E. Johnston

The 12th year, barley.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-70/S/CS/1, 71/S/CS/1(t), 72/S/CS/1(t) and 73-76/S/CS/1.

Design: A single replicate of 2^6 in 4 blocks of 4 plots each split into half and quarter plots, plus one additional plot per block similarly split. Treatments to wheat 1966-1976 have been ignored.

Whole plot dimensions: 5.49 x 40.2.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties:-

   JULIA
   WING

2. MILDFUNG — Fungicides to control mildew:

   NONE — None
   ETH+TRI — Ethirimol seed dressing + tridemorph foliar spray

Half plots

3. S N RATE — Rates of solid nitrogen fertiliser (kg N):

   50
   100

4. S N TIME — Times of applying solid nitrogen fertiliser:

   SEEDBED — Seedbed on 7 Apr, 1977
   TOPDRESS — Top dressed on 19 May

Quarter plots

5. L N RATE — Rates of liquid nitrogen fertiliser (kg N):

   0
   50 — (half 15 June, half 6 July)

6. RUSTFUNG — Fungicide to control rust:

   NONE — None
   BENODANI — Benodanil foliar spray

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XTRA WMR — Plus one additional whole plot per block sown to variety Wing, seed dressed ethirimol, given foliar sprays of tridemorph and benodanil and testing all combinations of:

Half plots

1. S N — Rates of solid nitrogen fertiliser (kg N):

25+25	25 to seedbed + 25 top dressed
50+50	50 to seedbed + 50 top dressed

Quarter plots

2. L N — Rates of liquid nitrogen fertiliser (kg N):

0	None
25+25	25 on 15 June + 25 on 6 July

NOTES: (1) Tridemorph at 0.53 kg applied with the weedkillers on 25 May.
(2) Benodanil applied at 1.12 kg in 340 l on 15 June and 6 July.

Basal applications: Manures: P_2O_5 at 50 kg with K_2O at 50 kg applied as (0:20:20).
Weedkillers: Ioxynil at 0.42 kg with mecoprop at 1.3 kg applied in 340 l.

Seed: Sown at 190 kg.

Cultivations, etc.:- Ploughed: 23 Nov, 1976. Seed sown, PK applied: 6 Apr, 1977.
Weedkillers applied: 25 May. Combine harvested: 8 Sept.

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GRAIN TONNES/HECTARE

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

MILDFUNG VARIETY	NONE	ETH+TRI	MEAN
JULIA	4.34	4.56	4.45
WING	4.35	4.62	4.48
MEAN	4.34	4.59	4.46

S N RATE VARIETY	50	100	MEAN
JULIA	4.02	4.87	4.45
WING	4.13	4.83	4.48
MEAN	4.08	4.85	4.46

S N RATE MILDFUNG	50	100	MEAN
NONE	4.06	4.62	4.34
ETH+TRI	4.09	5.08	4.59
MEAN	4.08	4.85	4.46

S N TIME VARIETY	SEEDBED	TOPDRESS	MEAN
JULIA	4.86	4.03	4.45
WING	4.80	4.16	4.48
MEAN	4.83	4.09	4.46

S N TIME MILDFUNG	SEEDBED	TOPDRESS	MEAN
NONE	4.80	3.89	4.34
ETH+TRI	4.87	4.30	4.59
MEAN	4.83	4.09	4.46

S N TIME S N RATE	SEEDBED	TOPDRESS	MEAN
50	4.26	3.89	4.08
100	5.40	4.30	4.85
MEAN	4.83	4.09	4.46

L N RATE VARIETY	0	50	MEAN
JULIA	4.38	4.52	4.45
WING	4.42	4.54	4.48
MEAN	4.40	4.53	4.46

L N RATE MILDFUNG	0	50	MEAN
NONE	4.28	4.40	4.34
ETH+TRI	4.52	4.65	4.59
MEAN	4.40	4.53	4.46

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GRAIN TONNES/HECTARE

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

L N RATE	0	50	MEAN
S N RATE			
50	3.92	4.23	4.08
100	4.88	4.83	4.85
MEAN	4.40	4.53	4.46

L N RATE	0	50	MEAN
S N TIME			
SEEDBED	4.72	4.95	4.83
TOPDRESS	4.08	4.11	4.09
MEAN	4.40	4.53	4.46

RUSTFUNG	NONE	BENODANI	MEAN
VARIETY			
JULIA	4.36	4.53	4.45
WING	4.34	4.62	4.48
MEAN	4.35	4.58	4.46

RUSTFUNG	NONE	BENODANI	MEAN
MILDFUNG			
NONE	4.26	4.42	4.34
ETH+TRI	4.44	4.73	4.59
MEAN	4.35	4.58	4.46

RUSTFUNG	NONE	BENODANI	MEAN
S N RATE			
50	3.99	4.16	4.08
100	4.71	4.99	4.85
MEAN	4.35	4.58	4.46

RUSTFUNG	NONE	BENODANI	MEAN
S N TIME			
SEEDBED	4.75	4.92	4.83
TOPDRESS	3.95	4.24	4.09
MEAN	4.35	4.58	4.46

RUSTFUNG	NONE	BENODANI	MEAN
L N RATE			
0	4.31	4.49	4.40
50	4.39	4.67	4.53
MEAN	4.35	4.58	4.46

MILDFUNG	NONE		ETH+TRI	
S N RATE	50	100	50	100
VARIETY				
JULIA	4.02	4.66	4.02	5.09
WING	4.11	4.59	4.15	5.08

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GRAIN TONNES/HECTARE

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

MILDFUNG	NONE		ETH+TRI	
S N TIME	SEEDBED	TOPDRESS	SEEDBED	TOPDRESS
VARIETY				
JULIA	4.92	3.75	4.80	4.31
WING	4.67	4.02	4.93	4.30

S N RATE	50		100	
S N TIME	SEEDBED	TOPDRESS	SEEDBED	TOPDRESS
VARIETY				
JULIA	4.20	3.84	5.53	4.22
WING	4.33	3.93	5.28	4.39

S N RATE	50		100	
S N TIME	SEEDBED	TOPDRESS	SEEDBED	TOPDRESS
MILDFUNG				
NONE	4.39	3.74	5.20	4.04
ETH+TRI	4.14	4.03	5.60	4.57

MILDFUNG	NONE		ETH+TRI	
L N RATE	0	50	0	50
VARIETY				
JULIA	4.29	4.39	4.46	4.65
WING	4.28	4.42	4.57	4.66

S N RATE	50		100	
L N RATE	0	50	0	50
VARIETY				
JULIA	3.89	4.15	4.86	4.89
WING	3.95	4.31	4.90	4.76

S N RATE	50		100	
L N RATE	0	50	0	50
MILDFUNG				
NONE	3.90	4.22	4.66	4.58
ETH+TRI	3.94	4.24	5.10	5.07

S N TIME	SEEDBED		TOPDRESS	
L N RATE	0	50	0	50
VARIETY				
JULIA	4.75	4.98	4.00	4.06
WING	4.69	4.91	4.15	4.17

S N TIME	SEEDBED		TOPDRESS	
L N RATE	0	50	0	50
MILDFUNG				
NONE	4.72	4.88	3.85	3.92
ETH+TRI	4.73	5.01	4.31	4.30

S N TIME	SEEDBED		TOPDRESS	
L N RATE	0	50	0	50
S N RATE				
50	4.06	4.47	3.78	3.99
100	5.39	5.42	4.37	4.24

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GRAIN TONNES/HECTARE

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

MILDFUNG	NONE		ETH+TRI	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
VARIETY				
JULIA	4.28	4.40	4.45	4.66
WING	4.24	4.45	4.43	4.80

S N RATE	50		100	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
VARIETY				
JULIA	3.98	4.06	4.75	5.00
WING	4.00	4.26	4.68	4.99

S N RATE	50		100	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
MILDFUNG				
NONE	3.98	4.14	4.54	4.70
ETH+TRI	4.00	4.18	4.88	5.28

S N TIME	SEEDBED		TOPDRESS	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
VARIETY				
JULIA	4.81	4.92	3.92	4.14
WING	4.69	4.91	3.99	4.33

S N TIME	SEEDBED		TOPDRESS	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
MILDFUNG				
NONE	4.73	4.86	3.79	3.99
ETH+TRI	4.77	4.97	4.11	4.49

S N TIME	SEEDBED		TOPDRESS	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
S N RATE				
50	4.24	4.29	3.74	4.03
100	5.26	5.54	4.16	4.44

L N RATE	0		50	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
VARIETY				
JULIA	4.33	4.42	4.40	4.64
WING	4.30	4.55	4.38	4.70

L N RATE	0		50	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
MILDFUNG				
NONE	4.21	4.36	4.32	4.49
ETH+TRI	4.42	4.61	4.46	4.85

L N RATE	0		50	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
S N RATE				
50	3.92	3.92	4.06	4.40
100	4.71	5.05	4.71	4.94

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GRAIN TONNES/HECTARE

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

L N RATE	0		50	
RUSTFUNG	NONE	BENODANI	NONE	BENODANI
S N TIME				
SEEDBED	4.72	4.73	4.79	5.11
TOPDRESS	3.91	4.25	3.99	4.23

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

TABLE	VARIETY	MILDFUNG	S N RATE	S N TIME
SED	0.158	0.158	0.087	0.087

TABLE	L N RATE	RUSTFUNG	VARIETY MILDFUNG	VARIETY S N RATE
SED	0.062	0.062	0.224	0.181
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.123

TABLE	MILDFUNG S N RATE	VARIETY S N TIME	MILDFUNG S N TIME	S N RATE S N TIME
SED	0.181	0.181	0.181	0.123
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY		0.123		
MILDFUNG	0.123		0.123	
S N RATE				0.181
S N TIME				0.181

TABLE	VARIETY L N RATE	MILDFUNG L N RATE	S N RATE L N RATE	S N TIME L N RATE
SED	0.170	0.170	0.107	0.107
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY	0.088			
MILDFUNG		0.088		
S N RATE			0.088	
S N TIME				0.088

TABLE	VARIETY RUSTFUNG	MILDFUNG RUSTFUNG	S N RATE RUSTFUNG	S N TIME RUSTFUNG
SED	0.170	0.170	0.107	0.107
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY	0.088			
MILDFUNG		0.088		
S N RATE			0.088	
S N TIME				0.088

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GRAIN TONNES/HECTARE

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

TABLE	L N RATE RUSTFUNG	VARIETY MILDFUNG S N RATE	VARIETY MILDFUNG S N TIME	VARIETY S N RATE S N TIME
SED	0.088	0.256	0.256	0.256
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.174
L N RATE	0.107			
RUSTFUNG	0.107			
VARIETY.MILDFUNG		0.174	0.174	

TABLE	MILDFUNG S N RATE S N TIME	VARIETY MILDFUNG L N RATE	VARIETY S N RATE L N RATE	MILDFUNG S N RATE L N RATE
SED	0.256	0.241	0.201	0.201
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY			0.151	
MILDFUNG	0.174			0.151
VARIETY.MILDFUNG		0.124		
VARIETY.S N RATE			0.124	
MILDFUNG.S N RATE				0.124

TABLE	VARIETY S N TIME L N RATE	MILDFUNG S N TIME L N RATE	S N RATE S N TIME L N RATE	VARIETY MILDFUNG RUSTFUNG
SED	0.201	0.201	0.151	0.241
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY	0.151			
MILDFUNG		0.151		
S N RATE			0.201	
S N TIME			0.201	
VARIETY.MILDFUNG				0.124
VARIETY.S N TIME	0.124			
MILDFUNG.S N TIME		0.124		
S N RATE.S N TIME			0.124	

TABLE	VARIETY S N RATE RUSTFUNG	MILDFUNG S N RATE RUSTFUNG	VARIETY S N TIME RUSTFUNG	MILDFUNG S N TIME RUSTFUNG
SED	0.201	0.201	0.201	0.201
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY	0.151		0.151	
MILDFUNG		0.151		0.151
VARIETY.S N RATE	0.124			
MILDFUNG.S N RATE		0.124		
VARIETY.S N TIME			0.124	
MILDFUNG.S N TIME				0.124

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GRAIN TONNES/HECTARE

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

TABLE	S N RATE S N TIME RUSTFUNG	VARIETY L N RATE RUSTFUNG	MILDFUNG L N RATE RUSTFUNG	S N RATE L N RATE RUSTFUNG
SED	0.151	0.201	0.201	0.201
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY		0.124		
MILDFUNG			0.124	
S N RATE	0.201			0.124
S N TIME	0.201			
L N RATE				0.151
RUSTFUNG				0.151
S N RATE.S N TIME	0.124			
VARIETY.L N RATE		0.151		
MILDFUNG.L N RATE			0.151	
VARIETY.RUSTFUNG		0.151		
MILDFUNG.RUSTFUNG			0.151	

TABLE	S N TIME L N RATE RUSTFUNG
SED	0.201
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
S N TIME	0.124
L N RATE	0.151
RUSTFUNG	0.151

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.317	7.1
BLOCK.WP.HP	5	0.246	5.5
BLOCK.WP.HP.QP	10	0.249	5.6

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED 0.00479

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77/S/CS/1

XTRA WMR

GRAIN TONNES/HECTARE

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

S N / L N	25+25	50+50	MEAN
25+25	4.47	5.45	4.96
50+50	4.74	5.45	5.10
MEAN	4.60	5.45	5.03

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

TABLE	S N	L N	S N / L N
SED	0.116	0.100	0.154
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
S N			0.142

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

STRATUM	DF	SE	CV%
BLOCK.WP.HP.QP	6	0.201	4.0

GRAIN MEAN DM% 83.9

SUB PLOT AREA HARVESTED 0.00479

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77/R/WW/1 and 77/W/WW/1

WINTER WHEAT

VARIETIES AND N

Object: To study the yields and flour quality of a selection of the newer varieties of winter wheat and the effects of nitrogen and aphicide on them on land in rotation (pathogen free) and after cereal (pathogen infected) - Rothamsted Webbs (pathogen free RH) and Great Knott I (pathogen infected RD), Woburn White Horse (pathogen free WH).

Sponsors: R. Moffitt, D.B. Slope.

Design: 4 randomised blocks of 9 plots split into 4 (except Webbs RH: 3 blocks only).

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties:

AR	Armada
AT	Atou
CA	Cappelle
FL	Flanders
MF	Maris Fundin
MH	Maris Huntsman
MK	Maris Kinsman
SA	Sappo (spring wheat replacing a winter variety which failed)
SP	Sportsman

Sub plots

2. N — Nitrogen fertiliser (kg N):

(RH)	(RD)&(WH)	Webbs (RH)	Great Knott I (RD) & White Horse (WH)
0	63	0	63 in spring
63	126	63 in spring	126 in spring
126	189	126 in spring	189 in spring
63+63	126+63	63 in spring + 63 at flowering	126 in spring + 63 at flowering

3. INSCTCDE — Insecticide (Great Knott I (RD) & White Horse (WH) only. Basal pirimicarb applied to Webbs (RH):

NONE	None
PIRIMICA	Pirimicarb at 0.14 kg in 250 l on 14 July (Great Knott I (RD)) and at 0.14 kg in 270 l on 15 July (White Horse (WH))

Basal applications: Manures:
Webbs (RH) and Great Knott I (RD): (0:20:20) at 310 kg, combine drilled.
Great Knott I (RD) only: Chalk at 7.5 t.
White Horse (WH): (0:20:20) at 250 kg.

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Weedkillers:
Webbs (RH): Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).
Great Knott I (RD): Terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l), ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.
White Horse (WH): Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.

Insecticide:
Webbs (RH) only: Pirimicarb at 0.14 kg in 270 l.

Seed: Webbs (RH) and Great Knott I (RD): Varieties sown at 200 kg.
White Horse (WH): Varieties sown at 210 kg.

NOTE: The variety Hobbit established poorly on all three sites because old seed was used and was replaced in the spring by Sappo spring wheat sown at 200 kg.

Cultivations, etc.:-
Webbs (RH): Deep-tine cultivated three times: 19-23 Nov, 1976. Heavy spring-tine cultivated: 24 Nov. Rotary harrowed, seed sown, spring-tine cultivated: 25 Nov. Power harrowed SA treatments: 4 Apr, 1977. SA treatments sown: 5 Apr. Spring N applied: 18 Apr. Weedkillers applied: 11 May. Late N applied: 27 June. Insecticide applied: 14 July. Combine harvested: 9 Sept. Previous crops: Barley 1975, potatoes 1976.
Great Knott I (RD): Deep-tine cultivated: 24 Aug, 1976. Chalk applied: 1 Sept. Deep-tine cultivated: 20 Nov. Seed sown, spring-tine cultivated: 22 Nov. 'Prebane' applied: 26 Nov. Power harrowed SA treatments: 4 Apr, 1977. SA treatments sown: 5 Apr. Spring N applied: 18 Apr. Ioxynil plus mecoprop applied: 2 May. Late N applied: 27 June. Combine harvested: 10 Sept. Previous crops: Beans 1975, wheat 1976.
White Horse (WH): Heavy spring-tine cultivated twice: 8-9 Nov, 1976. Spring-tine cultivated, seed sown: 10 Nov. Spring-tine cultivated with crumbler attached SA treatments, SA treatments sown: 31 Mar, 1977. Spring N applied: 15 Apr. Weedkiller applied: 10 May. Late N applied: 29 June. Combine harvested: 8 Sept. Previous crops: Beans 1975, potatoes 1976.

NOTE: Samples were taken in April and July, on Great Knott I (RD) only, for estimates of eyespot (Cercosporella herpotrichoides) and 'take-all' (Gaeumannomyces graminis).

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77/R/WW/1 WEBBS (RH) PATHOGEN FREE

GRAIN TONNES/HECTARE

VARIETY N	AR	AT	CA	FL	MF	MH	MK	SA	SP	MEAN
0	2 98	3.23	3.46	2.73	2.60	3.05	3.10	2.48	3.22	2.98
63	4.89	5.32	4.70	5.29	4.93	4.58	4.85	3.60	5.61	4.86
126	6.33	6.49	5.87	6.32	6.26	5.87	6.40	3.69	7.14	6.04
63+63	5.49	5.60	4.79	5.22	5.31	4.76	5.02	4.77	5.98	5.22
MEAN	4.92	5.16	4.70	4.89	4.77	4.57	4.84	3.64	5.49	4.78

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

TABLE	VARIETY	N	VARIETY N
SED	0.172	0.102	0.316
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.307

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.211	4.4
BLOCK.WP.SP	54	0.376	7.9

GRAIN MEAN DM% 79.5

SUB PLOT AREA HARVESTED 0.00173

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77/R/WW/1 GREAT KNOTT I (RD) PATHOGEN INFECTED

GRAIN TONNES/HECTARE

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

VARIETY N	AR	AT	CA	FL	MF	MH	MK	SA	SP	MEAN
63	4.39	4.36	3.72	4.56	4.26	5.27	4.85	3.80	4.06	4.36
126	5.27	6.10	5.24	5.45	5.39	4.90	6.71	3.67	5.65	5.38
189	5.33	6.19	5.26	6.12	5.93	6.04	7.61	3.33	5.53	5.70
126+63	6.65	6.33	5.40	5.76	5.75	5.52	5.30	3.42	6.47	5.62
MEAN	5.41	5.75	4.91	5.47	5.33	5.43	6.12	3.55	5.43	5.27

VARIETY INSCTCDE	AR	AT	CA	FL	MF	MH	MK	SA	SP	MEAN
NONE	5.30	5.73	4.79	5.37	5.27	5.53	6.10	3.28	5.49	5.21
PIRIMICA	5.52	5.76	5.02	5.58	5.40	5.33	6.13	3.83	5.36	5.32
MEAN	5.41	5.75	4.91	5.47	5.33	5.43	6.12	3.55	5.43	5.27

N	VARIETY INSCTCDE	AR	AT	CA	FL	MF	MH	MK	SA	SP
63	NONE	5.09	5.05	4.12	5.22	4.39	5.55	4.70	3.51	3.41
	PIRIMICA	3.68	3.66	3.32	3.90	4.12	5.00	5.00	4.09	4.72
126	NONE	5.40	6.07	4.51	4.53	5.21	4.82	7.14	3.38	6.26
	PIRIMICA	5.14	6.13	5.98	6.38	5.56	4.97	6.29	3.95	5.03
189	NONE	4.79	5.84	4.59	6.28	6.07	6.29	7.00	3.20	7.19
	PIRIMICA	5.86	6.54	5.93	5.96	5.80	5.79	8.23	3.45	3.87
126+63	NONE	5.90	5.97	5.94	5.46	5.40	5.47	5.58	3.03	5.11
	PIRIMICA	7.39	6.70	4.86	6.06	6.11	5.57	5.02	3.82	7.82

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

TABLE	VARIETY	N	INSCTCDE	VARIETY N
SED	0.335	0.203	0.144	0.625
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.609

TABLE	VARIETY INSCTCDE	VARIETY N INSCTCDE
SED	0.452	0.973
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:		
VARIETY	0.431	0.963

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.473	9.0
BLOCK.WP.SP	45	0.861	16.4

GRAIN MEAN DM% 81.2

SUB PLOT AREA HARVESTED 0.00172

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77/W/WW/1 WHITE HORSE (WH) PATHOGEN FREE

GRAIN TONNES/HECTARE

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

VARIETY	AR	AT	CA	FL	MF	MH	MK	SA	SP	MEAN
N										
63	4.22	4.13	3.80	3.10	3.26	3.51	4.25	4.10	5.00	3.93
126	4.59	4.45	3.67	4.03	3.93	4.16	4.99	3.42	4.94	4.24
189	4.42	3.70	3.57	3.67	3.05	3.76	4.28	2.72	4.29	3.72
126+63	4.43	4.36	3.89	3.45	3.56	4.25	4.20	3.39	5.10	4.07
MEAN	4.42	4.16	3.73	3.56	3.45	3.92	4.43	3.41	4.83	3.99

VARIETY	AR	AT	CA	FL	MF	MH	MK	SA	SP	MEAN
INSCTCDE										
NONE	4.34	4.04	3.61	3.41	3.40	3.89	4.20	3.35	4.74	3.89
PIRIMICA	4.49	4.28	3.86	3.71	3.50	3.95	4.66	3.47	4.92	4.10
MEAN	4.42	4.16	3.73	3.56	3.45	3.92	4.43	3.41	4.83	3.99

N	VARIETY INSCTCDE	AR	AT	CA	FL	MF	MH	MK	SA	SP
63	NONE	4.28	4.07	4.02	2.99	3.80	3.51	3.90	4.04	5.13
	PIRIMICA	4.16	4.19	3.58	3.21	2.71	3.52	4.59	4.16	4.87
126	NONE	4.40	4.29	3.30	3.91	3.82	3.73	4.70	3.38	4.67
	PIRIMICA	4.79	4.62	4.05	4.14	4.03	4.59	5.29	3.47	5.20
189	NONE	4.50	3.78	3.32	3.74	2.79	3.53	4.16	2.83	3.67
	PIRIMICA	4.34	3.62	3.82	3.61	3.32	3.98	4.41	2.61	4.91
126+63	NONE	4.17	4.03	3.79	3.00	3.18	4.77	4.05	3.13	5.48
	PIRIMICA	4.68	4.69	3.99	3.90	3.93	3.73	4.34	3.66	4.72

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

TABLE	VARIETY	N	INSCTCDE	VARIETY N
SED	0.166	0.098	0.069	0.304
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.293

TABLE	VARIETY INSCTCDE	VARIETY N INSCTCDE
SED	0.222	0.471
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:		
VARIETY	0.208	0.464

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.235	5.9
BLOCK.WP.SP	45	0.415	10.4

GRAIN MEAN DM% 83.5

SUB PLOT AREA HARVESTED 0.00173

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77/R/WW/2 and 77/W/WW/2

WINTER WHEAT

AQUEOUS N AND NITRIFICATION INHIBITORS

Object: To study the effects of adding a range of nitrification inhibitors to aqueous urea and aqueous ammonia on the yield and nitrogen uptake of winter wheat - Rothamsted (R), Fosters West and Woburn (W) Horsepool.

Sponsors: F.V. Widdowson, J. Ashworth, A. Penny.

Design: 2 randomised blocks of 32 plots (Fosters West (R)). 2 randomised blocks of 37 plots (Horsepool (W)).

Whole plot dimensions: Fosters West (R) 4.27 x 10.7
Horsepool (W) 4.27 x 13.7

Treatments: All combinations of:-

1. N FORM(1) Form of aqueous nitrogen:

AMMONIA	Aqueous ammonia 26% N
UREA	Aqueous urea 18% N

2. N RATE Rate of nitrogen (kg N):

70
100

3. N TIME Time of applying aqueous nitrogen:

AUTUMN
SPRING

4. NIT INHB Nitrification inhibitors added to aqueous nitrogen:

NONE	None
NITRAPYR	Nitrapyrin ('N-Serve')
SOD TRI	Sodium trithiocarbonate

plus extra treatments given additional forms of nitrogen fertiliser in spring (kg N):-

N FORM(2)

0	0
NC 60	60 As 'Nitro-Chalk'
NC 70	70 As 'Nitro-Chalk'
NC 80	80 As 'Nitro-Chalk'
NC 90	90 As 'Nitro-Chalk'
NC 100	100 As 'Nitro-Chalk'
NC 110	110 As 'Nitro-Chalk'
NC 120	120 As 'Nitro-Chalk' (Fosters West (R) only)

and at Horsepool (W) only, in aqueous form:-

AS 100	100 As ammonium sulphate
AS 100NI	100 As ammonium sulphate + nitrapyrin and carbon disulphide
AN 100	100 As ammonium nitrate
AN 100NI	100 As ammonium nitrate + nitrapyrin and carbon disulphide
CN 100	100 As calcium nitrate
CN 100NI	100 As calcium nitrate + nitrapyrin and carbon disulphide

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77/R/WW/2 and 77/W/WW/2

NOTES: (1) Nitrification inhibitor rates:
Fosters West(R): Aqueous N applied with nitrapyrin at 1.4 kg or with sodium trithiocarbonate at 39 kg in autumn and with nitrapyrin at 1.0 kg or with sodium trithiocarbonate at 23 kg in spring.
Horsepool (W): Aqueous N applied with nitrapyrin at 1.5 kg or with sodium trithiocarbonate at 38 kg in autumn and with nitrapyrin at 1.0 kg or with sodium trithiocarbonate at 23 kg to N FORM(1) and nitrapyrin at 1.0 kg plus carbon disulphide at 5.0 kg as an emulsion to appropriate treatments of N FORM(2) in spring.
(2) Aqueous nitrogen was applied by injectors with tines spaced 30 cm apart, 10 cm deep.

Basal applications:
Fosters West (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkiller: Paraquat at 0.56 kg ion in 220 l, ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 280 l. Growth regulator: Chlormequat at 1.7 kg applied with weedkiller in spring.
Horsepool (W): Manures: (0:20:20) at 310 kg, combine drilled. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Seed: Fosters West (R): Maris Huntsman, sown at 190 kg.
Horsepool (W): Maris Huntsman, sown at 180 kg.

Cultivations, etc.:-
Fosters West (R): Deep-tine cultivated twice: 25 Aug, 1976, 3 Sept. Aqueous N with inhibitors injected: 21, 25 Oct. Paraquat applied: 27 Oct. Heavy spring-tine cultivated: 20 Nov. Seed sown, spring-tine cultivated: 22 Nov. Aqueous N with inhibitors injected: 12-13 Apr, 1977. 'Nitro-Chalk' treatments applied: 2 May. Ioxynil plus mecoprop applied: 23 May. Insecticide applied: 15 July. Combine harvested: 8 Sept. Previous crops: Winter wheat and barley: 1975, winter oats 1976.
Horsepool (W): Deep-tine cultivated twice: 20 Aug, 1976, 23 Aug. Aqueous N with inhibitors injected: 12 Oct. Heavy-tine cultivated: 3 Nov. Seed sown: 4 Nov. Aqueous N with inhibitors injected: 14-15 Apr, 1977. 'Nitro-Chalk' treatments applied: 3 May. Insecticide applied: 11 July. Combine harvested: 9 Sept. Previous crops: Beans 1975, winter wheat 1976.

NOTES: (1) Soil samples were taken at monthly intervals, November to July for measurement of N in the injected bands. N was measured in a cross section of the band at Rothamsted only.
(2) Soil samples were taken at Woburn in selected plots to measure the amount of ammonium nitrate in the rhizosphere.
(3) Plant top samples were taken at fortnightly intervals from April until G.S.10 and then head samples for measurements of nitrate N.
(4) Flag leaf areas were measured several times during the growing season. Weights of the flag leaf and grain heads were also taken.
(5) Assessments were made of 'Take-all' (Gaeumannomyces graminis) on roots in selected plots at Woburn.
(6) At Woburn, waterlogging was noted at one side of the experiment and the effects of this were shown as a trend in yields. Yields presented have been adjusted for this trend.

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77/R/WW/2 FOSTERS WEST(R)

GRAIN TONNES/HECTARE

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

NIT INHB N TIME	NONE	NITRAPYR	SOD TRI	MEAN
AUTUMN	4.85	5.27	5.15	5.09
SPRING	5.39	5.64	5.56	5.53
MEAN	5.12	5.45	5.36	5.31

N FORM(1) N TIME	AMMONIA	UREA	MEAN
AUTUMN	5.08	5.10	5.09
SPRING	5.42	5.63	5.53
MEAN	5.25	5.37	5.31

N FORM(1) NIT INHB	AMMONIA	UREA	MEAN
NONE	5.03	5.20	5.12
NITRAPYR	5.44	5.46	5.45
SOD TRI	5.28	5.44	5.36
MEAN	5.25	5.37	5.31

N RATE N TIME	70	100	MEAN
AUTUMN	4.82	5.35	5.09
SPRING	5.27	5.78	5.53
MEAN	5.05	5.57	5.31

N RATE NIT INHB	70	100	MEAN
NONE	4.83	5.41	5.12
NITRAPYR	5.26	5.65	5.45
SOD TRI	5.06	5.65	5.36
MEAN	5.05	5.57	5.31

N RATE N FORM(1)	70	100	MEAN
AMMONIA	4.96	5.54	5.25
UREA	5.14	5.60	5.37
MEAN	5.05	5.57	5.31

NIT INHB	NONE		NITRAPYR		SOD TRI	
N FORM(1) N TIME	AMMONIA	UREA	AMMONIA	UREA	AMMONIA	UREA
AUTUMN	4.75	4.95	5.39	5.14	5.09	5.21
SPRING	5.32	5.46	5.49	5.78	5.46	5.66

NIT INHB	NONE		NITRAPYR		SOD TRI	
N RATE N TIME	70	100	70	100	70	100
AUTUMN	4.57	5.13	5.11	5.43	4.80	5.51
SPRING	5.08	5.69	5.41	5.86	5.33	5.79

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77/R/WW/2 FOSTERS WEST (R)

GRAIN TONNES/HECTARE

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

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
N TIME				
AUTUMN	4.73	5.43	4.92	5.28
SPRING	5.20	5.65	5.35	5.91

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
NIT INHB				
NONE	4.77	5.29	4.88	5.52
NITRAPYR	5.16	5.72	5.36	5.57
SOD TRI	4.95	5.60	5.18	5.70

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
N TIME NIT INHB				
AUTUMN NONE	4.44	5.06	4.70	5.19
NITRAPYR	5.16	5.62	5.05	5.24
SOD TRI	4.58	5.61	5.03	5.40
SPRING NONE	5.10	5.53	5.06	5.85
NITRAPYR	5.15	5.83	5.67	5.90
SOD TRI	5.33	5.59	5.33	5.99

N FORM(2)	0	NC 60	NC 70	NC 80	NC 90	NC 100	NC 110	NC 120	MEAN
	3.81	5.11	5.56	5.62	5.72	5.95	6.41	6.19	5.55

GRAND MEAN 5.37

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

TABLE	N FORM(2)	N TIME	NIT INHB	N FORM(1)
SED	0.282	0.081	0.100	0.081

TABLE	N RATE	N TIME NIT INHB	N TIME N FORM(1)	NIT INHB N FORM(1)
SED	0.081	0.141	0.115	0.141

TABLE	N TIME N RATE	NIT INHB N RATE	N FORM(1) N RATE	N TIME NIT INHB N FORM(1)
SED	0.115	0.141	0.115	0.199

TABLE	N TIME NIT INHB N RATE	N TIME N FORM(1) N RATE	NIT INHB N FORM(1) N RATE	N TIME NIT INHB N FORM(1) N RATE
SED	0.199	0.163	0.199	0.282

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

STRATUM	DF	SE	CV%
BLOCK.WP	31	0.282	5.2

GRAIN MEAN DM% 81.6 PLOT AREA HARVESTED 0.00325

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77/W/WW/2 HORSEPOOL(W)

GRAIN TONNES/HECTARE

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

NIT INHB N TIME	NONE	NITRAPYR	SOD TRI	MEAN
AUTUMN	3.19	3.86	3.98	3.68
SPRING	5.04	5.03	5.15	5.08
MEAN	4.12	4.45	4.57	4.38

N FORM(1) N TIME	AMMONIA	UREA	MEAN
AUTUMN	3.49	3.86	3.68
SPRING	5.21	4.95	5.08
MEAN	4.35	4.40	4.38

N FORM(1) NIT INHB	AMMONIA	UREA	MEAN
NONE	4.14	4.10	4.12
NITRAPYR	4.42	4.48	4.45
SOD TRI	4.50	4.63	4.57
MEAN	4.35	4.40	4.38

N RATE N TIME	70	100	MEAN
AUTUMN	3.57	3.79	3.68
SPRING	5.00	5.16	5.08
MEAN	4.28	4.47	4.38

N RATE NIT INHB	70	120	MEAN
NONE	4.12	4.11	4.12
NITRAPYR	4.38	4.52	4.45
SOD TRI	4.34	4.79	4.57
MEAN	4.28	4.47	4.38

N RATE N FORM(1)	70	100	MEAN
AMMONIA	4.23	4.47	4.35
UREA	4.33	4.47	4.40
MEAN	4.28	4.47	4.38

NIT INHB	NONE		NITRAPYR		SOD TRI	
N FORM(1) N TIME	AMMONIA	UREA	AMMONIA	UREA	AMMONIA	UREA
AUTUMN	3.11	3.27	3.68	4.05	3.69	4.26
SPRING	5.16	4.93	5.16	4.91	5.30	5.00

NIT INHB	NONE		NITRAPYR		SOD TRI	
N RATE N TIME	70	100	70	100	70	100
AUTUMN	3.19	3.18	3.94	3.79	3.56	4.39
SPRING	5.05	5.04	4.82	5.24	5.12	5.19

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77/W/WW/2 HORSEPOOL (W)

GRAIN TONNES/HECTARE

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

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
N TIME				
AUTUMN	3.39	3.59	3.74	3.98
SPRING	5.07	5.35	4.93	4.97

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
NIT INHB				
NONE	4.15	4.12	4.09	4.10
NITRAPYR	4.36	4.48	4.40	4.55
SOD TRI	4.18	4.82	4.50	4.77

N FORM(1)	AMMONIA		UREA	
N RATE	70	100	70	100
N TIME NIT INHB				
AUTUMN NONE	3.18	3.04	3.21	3.33
NITRAPYR	3.79	3.57	4.09	4.00
SOD TRI	3.21	4.17	3.91	4.61
SPRING NONE	5.13	5.19	4.97	4.88
NITRAPYR	4.93	5.38	4.71	5.10
SOD TRI	5.14	5.47	5.09	4.92

N FORM(2)	
0	3.39
NC 60	4.25
NC 70	4.73
NC 80	5.13
NC 90	4.93
NC 100	5.25
NC 110	4.45
AS 100	5.63
AS 100NI	5.71
AN 100	5.08
AN 100NI	5.42
CN 100	4.46
CN 100NI	4.44
MEAN	4.84

GRAND MEAN 4.54

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77/W/WW/2 HORSEPOOL (W)

GRAIN TONNES/HECTARE

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

TABLE	N FORM(2)	N TIME	NIT INHB	N FORM(1)
SED	0.610	0.175	0.213	0.174

TABLE	N RATE	N TIME NIT INHB	N TIME N FORM(1)	NIT INHB N FORM(1)
SED	0.175	0.303	0.249	0.303

TABLE	N TIME N RATE	NIT INHB N RATE	N FORM(1) N RATE	N TIME NIT INHB N FORM(1)
SED	0.248	0.302	0.247	0.431

TABLE	N TIME NIT INHB N RATE	N TIME N FORM(1) N RATE	NIT INHB N FORM(1) N RATE	N TIME NIT INHB N FORM(1) N RATE
SED	0.429	0.350	0.431	0.610

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

STRATUM	DF	SE	CV%
BLOCK.WP	35	0.602	13.3

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00279

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77/R/WW/4

WINTER WHEAT

SOWING DATES AND INSECTICIDES

Object: To study the effects of dates of sowing and times of applying insecticides on the incidence of cereal aphids, barley yellow dwarf virus(BYDV) and yield of winter wheat - Bylands.

Sponsor: R.T. Plumb.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

1. SOW DATE — Dates of sowing:

13 SEP	13 September 1976
21 OCT	21 October
26 NOV	26 November

2. INSCTCDE(1) — Phorate granules to seedbed:

NONE	None
PHORATE	Phorate at 5 kg

3. INSCTCDE(2) — Menazon spray:

NONE	None
MENAZON	Menazon (0.7 l 'Saphi-Col' in 220 l on 2 June, 1977)

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 380 kg. Weedkillers: Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 220 l.

Seed: Flanders, sown at 190 kg.

Cultivations, etc.:- Ploughed: 26 Aug, 1976. Spring-tine cultivated: 7 Sept. Phorate applied to early-sown plots, these plots power harrowed and sown: 13 Sept. Phorate applied to middle-sown plots: 20 Oct. Middle-sown plots spring-tine cultivated and sown: 21 Oct. Phorate applied to late-sown plots, these plots rotary harrowed and sown: 26 Nov. N applied to all plots: 9 Apr, 1977. Weedkillers applied: 18 Apr. Combine harvested: 7 Sept. Previous crops: Barley 1975, beans 1976.

NOTE: Plant emergence, aphid and virus counts were made during the season, tiller counts before harvest and grains per ear at harvest.

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77/R/WW/4

GRAIN TONNES/HECTARE

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

INSCTCDE(1)	NONE	PHORATE	MEAN
SOW DATE			
13 SEP	7.69	7.47	7.58
21 OCT	6.48	6.68	6.58
26 NOV	5.35	5.76	5.55
MEAN	6.51	6.64	6.57

INSCTCDE(2)	NONE	MENAZON	MEAN
SOW DATE			
13 SEP	7.37	7.80	7.58
21 OCT	6.43	6.73	6.58
26 NOV	5.30	5.80	5.55
MEAN	6.37	6.77	6.57

INSCTCDE(2)	NONE	MENAZON	MEAN
INSCTCDE(1)			
NONE	6.38	6.63	6.51
PHORATE	6.36	6.92	6.64
MEAN	6.37	6.77	6.57

INSCTCDE(1)	NONE		PHORATE	
INSCTCDE(2)	NONE	MENAZON	NONE	MENAZON
SOW DATE				
13 SEP	7.42	7.97	7.33	7.62
21 OCT	6.50	6.47	6.37	6.98
26 NOV	5.24	5.46	5.37	6.14

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

TABLE	SOW DATE	INSCTCDE(1)	INSCTCDE(2)	SOW DATE INSCTCDE(1)
SED	0.241	0.197	0.197	0.340

TABLE	SOW DATE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	SOW DATE INSCTCDE(1) INSCTCDE(2)
SED	0.340	0.278	0.481

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.590	9.0

GRAIN MEAN DM% 79.9

PLOT AREA HARVESTED 0.00267

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77/R/WW/6

WINTER WHEAT

RATES AND TIMES OF N AND K

Object: To study the effects of a range of rates and times of applying nitrogen and of forms of potassium on the nutrient uptake, protein quality and yield of two varieties of winter wheat - Fosters West.

Sponsors: O. Talibudeen, A. Penny, M.B. Page, B.J. Miflin, M. Kirkman.

Design: 3 randomised blocks of 2 plots split into 18.

Whole plot dimensions: 5.64 x 46.0.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties:

   CAPPELLE
   FLINOR

Sub plots

2. N S L — Rates, forms and times of applying nitrogen fertiliser (kg N):

	'Nitro-Chalk' in spring (20 Apr)		Urea spray at G.S.11.1 (19 July)
120 30	120	+	30
120 60	120	+	60
120 90	120	+	90

3. K FORM — Form of potassium fertiliser added to urea spray (at a 10:1 N:K atom ratio - urea dressings modified where KNO3 used to maintain correct total N):

NONE	None
KNO3	Potassium nitrate
K2SO4	Potassium sulphate

plus all combinations of:-

Whole plots

1. VARIETY — Varieties:

   CAPPELLE
   FLINOR

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77/R/WW/6

Sub plots

2. N S Rates of 'Nitro-Chalk' in spring (20 Apr) (kg N):

0
30
60
90
120 (duplicated)
150
180
210

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l, applied in autumn. Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 220 l, applied in spring. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Varieties sown at 200 kg.

Cultivations, etc.:- Deep-tine cultivated: 25 Aug, 1976, 3 Sept. Autumn weedkiller applied: 27 Oct. Heavy spring-tine cultivated: 20 Nov. Sown: 24 Nov. Spring weedkillers applied: 23 May, 1977. Insecticide applied: 15 July. Combine harvested: 6 Sept. Previous crops: Winter barley 1975, winter oats 1976.

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

TABLE	N S L	K FORM	N S	VARIETY N S L	
SED	0.161	0.161	0.278 0.241	0.227*	MIN REP MAX-MIN

TABLE	VARIETY K FORM	N S L K FORM	VARIETY N S	VARIETY N S L K FORM	
SED	0.277*	0.278	0.394* 0.341*	0.394*	MIN REP MAX-MIN

* WITHIN THE SAME LEVEL OF VARIETY ONLY

	N S
MAX-MIN	120 V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	70	0.482	9.2

GRAIN MEAN DM% 79.3

SUB PLOT AREA HARVESTED 0.00073

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77/R/WW/6

GRAIN TONNES/HECTARE

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

UREA SPRAYS APPLIED

N S L / VARIETY	120 30	120 60	120 90	MEAN
CAPPELLE	5.57	5.50	5.56	5.54
FLINOR	5.30	5.19	5.37	5.29
MEAN	5.43	5.35	5.47	5.41

K FORM / VARIETY	NONE	KNO3	K2SO4	MEAN
CAPPELLE	5.62	5.73	5.28	5.54
FLINOR	5.50	5.03	5.34	5.29
MEAN	5.56	5.38	5.31	5.41

K FORM / N S L	NONE	KNO3	K2SO4	MEAN
120 30	5.49	5.54	5.27	5.43
120 60	5.50	5.40	5.14	5.35
120 90	5.69	5.20	5.51	5.47
MEAN	5.56	5.38	5.31	5.41

VARIETY	K FORM / N S L	NONE	KNO3	K2SO4
CAPPELLE	120 30	5.45	6.04	5.21
	120 60	5.59	5.71	5.19
	120 90	5.83	5.42	5.43
FLINOR	120 30	5.54	5.03	5.33
	120 60	5.41	5.08	5.09
	120 90	5.54	4.97	5.59

UREA SPRAYS NOT APPLIED

VARIETY / N S	CAPPELLE	FLINOR	MEAN
0	3.00	2.97	2.98
30	3.34	3.79	3.56
60	4.36	4.49	4.43
90	5.68	4.77	5.23
120	5.97	5.41	5.69
150	5.68	5.74	5.71
180	6.72	5.76	6.24
210	5.57	5.74	5.66
MEAN	5.14	4.90	5.02

GRAND MEAN 5.22

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77/S/WW/1

WINTER WHEAT

RATES AND TIMES OF N AND FUNGICIDE

Object: To study the effects of fungicide and rates and times of applying nitrogen fertiliser on the incidence of foliar diseases and on yield - Saxmundham.

Sponsors: F.V. Widdowson, A. Penny.

Design: Single replicate of 4 x 2 x 2 x 2 fully randomised plus 4 extra plots.

Whole plot dimensions: 2.74 x 6.10.

Treatments: All combinations of:-

1. S N RATE — Rates of solid nitrogen fertiliser (kg N):

   0
   50
   100
   150

2. S N TIME — Times of applying solid nitrogen fertiliser:

   APRIL — 28 April
   MAY — 19 May

3. L N RATE — Rates of applying liquid nitrogen fertiliser, half on 16 June, half on 6 July (kg N):

   0
   50

4. FUNGCIDE — Foliar spray to control fungi:

   NONE — None
   B+MB+MZ — Benomyl + maneb + mancozeb

plus four extra plots not given liquid fertiliser but given benomyl + maneb + mancozeb as above, and testing solid nitrogen as follows (kg N):-

XTRA S N	G.S.3(16 Mar)		G.S.5(28 Apr)		G.S.8(25 May)	
20+60+20	20	+	60	+	20	(duplicated)
30+90+30	30	+	90	+	30	(duplicated)

NOTE: Benomyl applied at 0.28 kg with mancozeb plus maneb ('Kascade' at 2.24 kg) in 340 l on 19 May, 16 June, 6 July.

Basal applications: Manures: K20 at 150 kg as muriate of potash. (30:13:0) at 190 kg. Weedkillers: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 340 l. Growth regulator: Chlormequat at 1.7 kg in 340 l.

Seed: Maris Huntsman, broadcast at 200 kg.

Cultivations, etc.:- K applied: 17 Aug, 1976. Ploughed 3 Sept. Seed broadcast, NP applied: 23 Nov. Spring-tine cultivated: 24 Nov. Weedkillers applied: 14 May, 1977. Growth regulator applied: 19 May. Combine harvested: 1 Sept. Previous crops: Beans 1975, wheat 1976.

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77/S/WW/1

GRAIN TONNES/HECTARE

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

INCLUDING S N RATE 0

S N RATE	0	50	100	150	MEAN
L N RATE					
0	3.20	4.72	5.29	5.76	4.74
50	3.61	4.64	4.77	5.71	4.68
MEAN	3.40	4.68	5.03	5.74	4.71

S N RATE	0	50	100	150	MEAN
FUNGCIDE					
NONE	3.38	4.80	4.78	5.43	4.60
B+MB+MZ	3.42	4.56	5.28	6.04	4.83
MEAN	3.40	4.68	5.03	5.74	4.71

FUNGCIDE	NONE	B+MB+MZ	MEAN
L N RATE			
0	4.65	4.84	4.74
50	4.55	4.82	4.68
MEAN	4.60	4.83	4.71

EXCLUDING S N RATE 0

S N RATE	50	100	150	MEAN
S N TIME				
APRIL	5.49	5.84	6.53	5.95
MAY	3.88	4.22	4.94	4.35
MEAN	4.68	5.03	5.74	5.15

L N RATE	0	50	MEAN
S N TIME			
APRIL	6.06	5.85	5.95
MAY	4.46	4.24	4.35
MEAN	5.26	5.04	5.15

FUNGTIME	NONE	B+MB+MZ	MEAN
S N TIME			
APRIL	5.63	6.27	5.95
MAY	4.38	6.38	4.35
MEAN	5.01	5.29	5.15

XTRA S N	20+60+20	30+90+30	MEAN
	6.19	6.69	6.44

GRAND MEAN 4.91

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77/S/WW/1

GRAIN TONNES/HECTARE

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

TABLE	XTRA S N	L N RATE	FUNGCIDE	S N RATE
SED	0.369	0.131 0.151*	0.131 0.151*	0.185

TABLE	S N TIME	L N RATE FUNGCIDE	S N RATE S N TIME	S N RATE L N RATE
SED	0.151	0.185	0.261	0.261

TABLE	S N TIME L N RATE	S N RATE FUNGCIDE	S N TIME FUNGCIDE
SED	0.213	0.261	0.213

* USE ONLY WITH TABLES EXCLUDING S N RATE 0

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

STRATUM	DF	SE	CV%
WP	15	0.369	7.5

GRAIN MEAN DM% 76.8

PLOT AREA HARVESTED 0.00089

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77/R/WS/1

SPRING WHEAT

FUNGICIDES AND GRAIN MICROFLORA

Object: To study the effects of a range of fungicides applied at a range of times on the yield, quality and grain microflora of spring wheat - Summerdells II.

Sponsor: R.A. Hill.

Design: Two replicates of 3 x 2 x 2 x 2 fully randomised.

Whole plot dimensions: 4.27 x 13.1.

Treatments: All combinations of:-

1. FUNGCIDE — Broad spectrum fungicides (in addition to basal specific fungicide tridemorph)

CAPTAFOL	Captafol at 1.4 kg
CARB+MAN	Carbendazim at 0.25 kg + maneb at 1.6 kg
BENOMYL	Benomyl at 1.1 kg

2. APP TIME — Application times of broad spectrum fungicides:

	7 July	28 July	30 Aug
NONE	None	None	None
E	Sprayed	None	None
M	None	Sprayed	None
L	None	None	Sprayed
E+M	Sprayed	Sprayed	None
E+L	Sprayed	None	Sprayed
M+L	None	Sprayed	Sprayed
E+M+L	Sprayed	Sprayed	Sprayed

NOTE: Treatment sprays were applied in 340 l.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Seed: Sappo, sown at 190 kg.

Cultivations, etc:- Ploughed: 13-18 Oct, 1976. Spring-tine cultivated: 7 Mar, 1977. Spring-tine cultivated, seed sown: 4 Apr. Weedkillers applied: 26 May. Fungicide applied: 19 June. Insecticide applied: 14 July. Combine harvested: 23 Sept. Previous crops: Winter oats 1975, 1976.

NOTE: Grain microflora were assessed weekly after heading and at harvest. 1000 grain weights were taken and grain was assessed for breadmaking quality.

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77/R/WS/1

GRAIN TONNES/HECTARE

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

APP TIME / FUNGCIDE	E	M	L	E+M	E+L	M+L	E+M+L	MEAN
CAPTAFOL	6.18	6.15	6.01	6.21	6.22	6.37	6.35	6.21
CARB+MAN	6.28	6.34	6.10	6.36	6.42	6.16	6.39	6.29
BENOMYL	6.19	6.44	6.18	6.48	6.26	5.74	6.48	6.25
MEAN	6.22	6.31	6.09	6.35	6.30	6.09	6.40	6.25

APP TIME NONE 6.15

GRAND MEAN 6.24

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

TABLE	FUNGCIDE	APP TIME	FUNGCIDE APP TIME
SED	0.079	0.120	0.209

SED OF FUNGCIDE.APP TIME V APP TIME NONE 0.170

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

STRATUM	DF	SE	CV%
WP	26	0.209	3.3

GRAIN MEAN DM% 77.4

PLOT AREA HARVESTED 0.00195

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77/R/WS/2

SPRING WHEAT

IRRIGATION, LODGING, N, CCC AND MICROFLORA

Object: To study the effects of irrigation, artificial lodging, nitrogen fertiliser and a growth regulator on grain microflora and yield - Long Hoos V 2.

Sponsor: R.A. Hill.

Design: 2 randomised blocks of 2 plots split into 8.

Whole plot dimensions: 9.75 x 17.4.

Treatments: All combinations of:-

Whole plots

1. IRRIGTN Irrigation:

NONE	None
FULL	Full (75 mm)

Sub plots

2. N Nitrogen fertiliser (kg N):

25
100

3. LODGING Lodging:

NONE	None, supported by netting
LODGED	Lodged, under netting

4. GRWTHREG Growth regulator:

NONE	None
CHLORMEQ	Chlormequat (CCC) at 1.1 kg in 340 l on 19 June, 1977

NOTES: (1) N applied on 9 May.
(2) Irrigation was applied at 5 mm on each dry day during the season, divided equally between morning and afternoon.

Basal applications: Manures: (0:14:28) at 940 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 5.6 l in 340 l).

Seed: Sappo, sown at 180 kg.

Cultivations, etc.:- Deep-tine cultivated: 13 Sept, 1976. PK applied: 8 Nov. Ploughed: 9 Nov to 14 Dec. Power harrowed and seed sown: 14 Apr, 1977. Weedkillers applied: 1 June. Combine harvested: 27 Sept. Previous crops: Lupins 1975, spring oats 1976.

NOTE: Grain microflora were assessed during the season and at harvest. Grain was assessed for mycotoxins before and after harvest and after storage.

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77/R/WS/2

GRAIN TONNES/HECTARE

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

N	25	100	MEAN
IRRIGTN			
NONE	2.43	2.64	2.54
FULL	2.43	2.38	2.40
MEAN	2.43	2.51	2.47

LODGING	NONE	LODGED	MEAN
IRRIGTN			
NONE	3.77	1.30	2.54
FULL	3.72	1.09	2.40
MEAN	3.74	1.20	2.47

LODGING	NONE	LODGED	MEAN
N			
25	3.58	1.29	2.43
100	3.91	1.11	2.51
MEAN	3.74	1.20	2.47

GRWTHREG	NONE	CHLORMEQ	MEAN
IRRIGTN			
NONE	2.38	2.69	2.54
FULL	2.31	2.50	2.40
MEAN	2.35	2.60	2.47

GRWTHREG	NONE	CHLORMEQ	MEAN
N			
25	2.35	2.51	2.43
100	2.34	2.68	2.51
MEAN	2.35	2.60	2.47

GRWTHREG	NONE	CHLORMEQ	MEAN
LODGING			
NONE	3.60	3.89	3.74
LODGED	1.09	1.30	1.20
MEAN	2.35	2.60	2.47

N	25		100	
LODGING	NONE	LODGED	NONE	LODGED
IRRIGTN				
NONE	3.51	1.36	4.03	1.25
FULL	3.64	1.22	3.79	0.96

N	25		100	
GRWTHREG	NONE	CHLORMEQ	NONE	CHLORMEQ
IRRIGTN				
NONE	2.30	2.56	2.46	2.83
FULL	2.41	2.45	2.22	2.54

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77/R/WS/2

GRAIN TONNES/HECTARE

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

LODGING	NONE		LODGED	
GRWTHREG	NONE	CHLORMEQ	NONE	CHLORMEQ
IRRIGTN				
NONE	3.56	3.99	1.20	1.40
FULL	3.65	3.79	0.97	1.21

LODGING	NONE		LODGED	
GRWTHREG	NONE	CHLORMEQ	NONE	CHLORMEQ
N				
25	3.53	3.62	1.18	1.39
100	3.68	4.15	0.99	1.22

	LODGING	NONE		LODGED	
	GRWTHREG	NONE	CHLORMEQ	NONE	CHLORMEQ
IRRIGTN	N				
NONE	25	3.35	3.67	1.25	1.46
	100	3.76	4.30	1.15	1.35
FULL	25	3.70	3.58	1.11	1.33
	100	3.59	3.99	0.84	1.08

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

TABLE	N	LODGING	GRWTHREG	IRRIGTN* N
SED	0.065	0.065	0.065	0.092

TABLE	IRRIGTN* LODGING	N LODGING	IRRIGTN* GRWTHREG	N GRWTHREG
SED	0.092	0.092	0.092	0.092

TABLE	LODGING GRWTHREG	IRRIGTN* N LODGING	IRRIGTN* N GRWTHREG	IRRIGTN* LODGING GRWTHREG
SED	0.092	0.129	0.129	0.129

TABLE	N LODGING GRWTHREG	IRRIGTN* N LODGING GRWTHREC
SED	0.129	0.183

* WITHIN THE SAME LEVEL OF IRRIGTN ONLY

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

BLOCK.WP.SP	14	0.183	7.4

GRAIN MEAN DM% 76.0

SUB PLOT AREA HARVESTED 0.00087

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77/W/B/1

SPRING BARLEY

IRRIGATION, P, K AND ROOT GROWTH

Object: To study the effects of sowing date, irrigation, phosphate and potash on root growth and yield - Butt Close II.

Sponsor: P.J. Welbank.

Design: 3 randomised blocks of 2 plots split into halves and eighths.

Whole plot dimensions: 15.2 x 30.5.

Treatments: All combinations of:-

Whole plots

1. SOW DATE — Dates of sowing:

   15 MARCH
   26 MAY

Half plots

2. IRRIGTN — Irrigation:

   NONE — None
   FULL — Full to maintain soil moisture deficit below 25 mm

Eighth plots

3. P205 — Phosphate (kg P205) as superphosphate:

   0
   100

4. K20 — Potash (kg K20) as muriate of potash:

   0
   120

NOTE: The second sowing was initially made on 25 April. These plots were severely damaged by birds and rabbits and were resown on 26 May.

Irrigation treatments (mm water):

First sowing		Second sowing	
2 June	19.0	29 June	25.0
30 June	25.0	11 July	12.5
11 July	12.5	27 July	12.5
		29 July	12.5
		10-12 Aug	50.0
Total	56.5		112.5

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77/W/B/1

Standard applications: Manures: 100 kg N as 'Nitro-Chalk'. Weedkiller: First sowing only: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 5.6 kg in 340 l). Second sowing only: Paraquat at 0.84 kg ion in 280 l.

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

Cultivations, etc.:- Ploughed: 10 Nov, 1976. Spring-tine cultivated: 10 Mar, 1977. P and K treatments applied: 11 Mar. N applied for first sowing, all plots spring-tine cultivated, seed sown: 15 Mar. N applied for late sowing, these plots only spring-tine cultivated with crumbler attached: 25 Apr. Seed sown: 26 Apr. Dicamba with mecoprop and MCPA applied to first sowing only: 18 May. Paraquat applied to second sowing only: 25 May. Second sowing plots rotary cultivated and resown: 26 May. First sowing harvested by hand: 31 Aug. Second sowing harvested by hand: 22 Sept. Previous cropping: Fallow 1975, 1976.

NOTES: (1) Plant counts were made on the first sowing date on 13 April and on the second sowing date on 29 June.

(2) Top and root samples were taken at weekly intervals for estimates of leaf area, shoot numbers, root lengths, crop and root dry weights and NPK content.

(3) Estimates of soil moisture content were made weekly.

(4) Because of an error in weighing, the yields from two plots with the following treatment combinations were lost:

SOW DATE	26 MAY	26 MAY
IRRIGTN	NONE	FULL
P205	0	100
K20	120	120

Estimated values were used in the analysis.

(5) On one block of the second sowing date yields were not taken because the crop had been severely grazed by rabbits.

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77/W/B/1

GRAIN TONNES/HECTARE

SOW DATE 15 MARCH

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

P205	0	100	MEAN
IRRIGTN			
NONE	4.02	4.91	4.47
FULL	6.00	5.84	5.92
MEAN	5.01	5.37	5.19

K20	0	120	MEAN
IRRIGTN			
NONE	4.42	4.51	4.47
FULL	5.55	6.28	5.92
MEAN	4.99	5.40	5.19

K20	0	120	MEAN
P205			
0	4.88	5.14	5.01
100	5.09	5.65	5.37
MEAN	4.99	5.40	5.19

P205	0		100	
K20	0	120	0	120
IRRIGTN				
NONE	3.83	4.22	5.01	4.81
FULL	5.93	6.07	5.18	6.50

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

TABLE	P205	K20	IRRIGTN* P205	IRRIGTN* K20
SED	0.210	0.210	0.297	0.297

TABLE	P205 K20	IRRIGTN* P205 K20
SED	0.297	0.420

* WITHIN SAME LEVEL OF IRRIGTN ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP.SSP	12	0.515	9.9

GRAIN MEAN DM% 88.7

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77/W/B/1

GRAIN TONNES/HECTARE

SOW DATE 26 MAY

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

P205 IRRIGTN	0	100	MEAN
NONE	1.50	1.59	1.54
FULL	1.54	1.66	1.60
MEAN	1.52	1.63	1.57

K20 IRRIGTN	0	120	MEAN
NONE	1.63	1.46	1.54
FULL	1.58	1.62	1.60
MEAN	1.61	1.54	1.57

K20 P205	0	120	MEAN
0	1.65	1.39	1.52
100	1.57	1.69	1.63
MEAN	1.61	1.54	1.57

P205	0		100	
K20	0	120	0	120
IRRIGTN				
NONE	1.77	1.23	1.49	1.69
FULL	1.52	1.55	1.65	1.68

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

TABLE	P205	K20	IRRIGTN* P205	IRRIGTN* K20
SED	0.160	0.160	0.226	0.226

TABLE	P205 K20	IRRIGTN* P205 K20
SED	0.226	0.319

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP.SSP	4	0.319	20.3

GRAIN MEAN DM% 87.8

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77/W/B/1

STRAW TONNES/HECTARE

SOW DATE 26 MAY

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

P205	0	100	MEAN
IRRIGTN			
NONE	2.41	2.48	2.45
FULL	2.92	3.29	3.11
MEAN	2.67	2.89	2.78

K20	0	120	MEAN
IRRIGTN			
NONE	2.58	2.32	2.45
FULL	2.96	3.25	3.11
MEAN	2.77	2.78	2.78

K20	0	120	MEAN
P205			
0	2.75	2.59	2.67
100	2.79	2.98	2.89
MEAN	2.77	2.78	2.78

P205	0		100	
K20	0	120	0	120
IRRIGTN				
NONE	2.77	2.06	2.39	2.58
FULL	2.73	3.11	3.19	3.38

STRAW MEAN DM% 83.7

EIGHTH PLOT AREA HARVESTED 0.00012

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77/W/B/1

STRAW TONNES/HECTARE

SOW DATE 15 MARCH

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

P205	0	100	MEAN
IRRIGTN			
NONE	4.74	5.22	4.98
FULL	6.68	6.61	6.64
MEAN	5.71	5.92	5.81

K20	0	120	MEAN
IRRIGTN			
NONE	4.89	5.08	4.98
FULL	5.91	7.37	6.64
MEAN	5.40	6.22	5.81

K20	0	120	MEAN
P205			
0	5.36	6.06	5.71
100	5.45	6.38	5.92
MEAN	5.40	6.22	5.81

P205	0		100	
K20	0	120	0	120
IRRIGTN				
NONE	4.46	5.03	5.33	5.12
FULL	6.26	7.10	5.57	7.65

STRAW MEAN DM% 89.3

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77/R/B/2 and 77/W/B/2

SPRING BARLEY

VARIETIES AND N

Object: To study the yields of some of the newer varieties of barley. Three nitrogen rates are included and on one variety the effects of mildew control are also studied - Rothamsted (R) Gt. Harpenden II and Woburn (W) Gt. Hill Bottom I.

Sponsor: R. Moffitt.

Design: Gt. Harpenden II (R): 4 randomised blocks of 12 plots split into 3.
Gt. Hill Bottom I (W): 3 randomised blocks of 12 plots split into 3.

Whole plot dimensions: Gt. Harpenden II (R): 4.27 x 24.7.
Gt. Hill Bottom I (W): 4.27 x 20.1.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties and mildew control:

JULIA O	Julia, no fungicide
JULIA E	Julia, seed dressed ethirimol (two plots/block Gt. Hill Bottom I (W) only)
JULIA TD	Julia, crop sprayed tridemorph (two plots/block)
JULIA TF	Julia, seed dressed triforine (Gt. Harpenden II (R) only)
ARAMIR	Aramir)
ARKROYAL	Ark Royal)
GEORGIE	Georgie)
LOFAABED	Lofa Abed) Crop sprayed tridemorph
MAZURKA	Mazurka)
PORTHOS	Porthos)
SUNDANCE	Sundance)

Sub plots

2. N — Nitrogen fertiliser (kg N):

38
75
113

NOTES: (1) Gt. Harpenden II (R): Tridemorph applied at 0.53 kg in 340 l: 22 June.
(2) Gt. Hill Bottom I (W): Tridemorph applied at 0.53 kg in 420 l: 23 June.

Basal applications:
Gt. Harpenden II (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).
Gt. Hill Bottom I (W): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 220 l.

Seed: Gt. Harpenden II (R): Varieties sown at 160 kg.
Gt. Hill Bottom I (W): Varieties sown at 160 kg.

Cultivations, etc.:-
Gt. Harpenden II (R): Deep-tine cultivated: 22 Sept, 1976. Heavy spring-tine cultivated: 28 Sept. Ploughed: 18 Nov. Spring-tine cultivated: 10 Mar, 1977. Rotary harrowed, seed sown: 31 Mar. Test N applied: 19 May. Weedkillers applied: 26 May. Combine harvested: 5 Sept. Previous crops: Potatoes 1975, barley 1976.

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77/R/B/2 and 77/W/B/2

Gt. Hill Bottom I (W): Ploughed: 23 Sept, 1976. Heavy spring-tine cultivated: 8 Mar, 1977. Power harrowed: 9 Mar. Spring-tine cultivated with crumbler attached, seed sown: 4 Apr. Weedkiller applied: 19 May. Combine harvested: 5 Sept. Previous crops: Potatoes 1975, winter wheat 1976.

77/R/B/2 GT HARPENDEN II (R)

GRAIN TONNES/HECTARE

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

N	38	75	113	MEAN
VARIETY				
JULIA O	4.12	4.51	4.46	4.36
JULIA E	4.46	4.85	4.52	4.61
JULIA TD	5.06	5.38	5.36	5.27
JULIA TF	4.45	4.70	4.43	4.53
ARAMIR	4.61	5.24	5.27	5.04
ARKROYAL	5.26	5.19	4.94	5.13
GEORGIE	5.22	5.44	5.44	5.36
LOFAABED	5.66	5.84	5.89	5.79
MAZURKA	4.70	5.01	5.08	4.93
PORTHOS	4.59	5.08	5.26	4.98
SUNDANCE	5.08	5.61	5.44	5.38
MEAN	4.86	5.19	5.12	5.05

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

TABLE	VARIETY	N	VARIETY N	
SED	0.156		0.202	MIN REP
	0.135	0.045	0.175	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY			0.157	MIN REP
			0.111	MAX REP

	VARIETY
MAX REP	JULIA TD
MAX-MIN	JULIA TD V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.221	4.4
BLOCK.WP.SP	74	0.221	4.4

GRAIN MEAN DM% 79.0

SUB PLOT AREA HARVESTED 0.00163

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77/W/B/2 GT HILL BOTTOM I (W)

GRAIN TONNES/HECTARE

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

N	38	75	113	MEAN
VARIETY				
JULIA O	3.38	4.59	4.89	4.29
JULIA E	3.32	4.34	4.50	4.05
JULIA TD	3.86	4.69	4.84	4.46
ARAMIR	3.43	4.48	4.84	4.25
ARKROYAL	3.99	4.89	5.15	4.68
GEORGIE	4.23	5.07	5.64	4.98
LOFAABED	4.41	4.91	5.59	4.97
MAZURKA	4.06	4.48	5.07	4.54
PORTHOS	3.36	4.66	4.72	4.25
SUNDANCE	4.52	5.58	5.84	5.31
MEAN	3.81	4.73	5.03	4.52

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

TABLE	VARIETY	N	VARIETY N	
SED	0.183		0.303	MIN REP
	0.158	0.086	0.263	MAX-MIN
	0.129		0.215	MAX REP
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY			0.297	MIN REP
			0.210	MAX REP

	VARIETY
MAX REP	JULIA E AND JULIA TD
MAX-MIN	JULIA E AND JULIA TD V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.224	4.9
BLOCK.WP.SP	52	0.364	8.0

GRAIN MEAN DM% 82.6

SUB PLOT AREA HARVESTED 0.00173

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77/R/B/3

SPRING BARLEY

N AND FOLIAR DISEASES

Object: To study the effects of mildew and brown rust on response to a range of nitrogen rates applied at different times - Long Hoos I/II.

Sponsors: J.F. Jenkyn, M.E. Finney.

Design: Single replicate of 6 x 3 x 2 x 2.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. N RATE Amounts of nitrogen fertiliser (kg N):

   25
   50
   70
   90
   110
   135

2. N TIME Times of applying N:

SB	Seedbed (12 Apr, 1976)
TD	Top dressed (26 May)
SB/TD	Half to seedbed, half top dressed

3. MILDEW F Mildew fungicide:

NONE	None
TRIDEMOR	Tridemorph on 20 June and 13 July

4. RUST F Rust fungicide:

NONE	None
BENODANI	Benodanil on 11 July

NOTES: (1) Fungicides were applied in 340 l:-
(a) Tridemorph at 0.53 kg
(b) Benodanil at 1.12 kg with 175 ml 'Citowett'
(2) Sides of plots were separated by a strip of Mazurka barley 2.13 m wide.

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Zephyr, sown at 160 kg.

Cultivations, etc.:- Ploughed: 30 Sept, 1976. Spring-tine cultivated, seed sown: 31 Mar, 1977. Weedkillers applied: 26 May. Combine harvested: 27 Aug. Previous crops: Potatoes 1975, wheat 1976.

NOTES: (1) Seedling emergence counts were made.
(2) Mildew and brown rust were assessed throughout the season.
(3) Samples were taken for N analysis.
(4) Ear counts were made before harvest.

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77/R/B/3

GRAIN TONNES/HECTARE

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

N TIME / N RATE	SB	TD	SB/TD	MEAN
25	4.99	5.00	5.00	4.99
50	5.18	5.54	5.60	5.44
70	5.48	5.49	5.71	5.56
90	5.54	5.66	6.09	5.76
110	5.73	5.48	6.05	5.75
135	5.77	5.75	6.08	5.86
MEAN	5.45	5.49	5.75	5.56

MILDEW F / N RATE	NONE	TRIDEMOR	MEAN
25	4.90	5.09	4.99
50	5.34	5.55	5.44
70	5.33	5.79	5.56
90	5.49	6.03	5.76
110	5.49	6.01	5.75
135	5.59	6.14	5.86
MEAN	5.36	5.77	5.56

MILDEW F / N TIME	NONE	TRIDEMOR	MEAN
SB	5.30	5.59	5.45
TD	5.23	5.75	5.49
SB/TD	5.54	5.96	5.75
MEAN	5.36	5.77	5.56

RUST F / N RATE	NONE	BENODANI	MEAN
25	5.07	4.92	4.99
50	5.56	5.33	5.44
70	5.64	5.48	5.56
90	5.73	5.79	5.76
110	5.71	5.79	5.75
135	5.76	5.96	5.86
MEAN	5.58	5.55	5.56

RUST F / N TIME	NONE	BENODANI	MEAN
SB	5.41	5.49	5.45
TD	5.50	5.48	5.49
SB/TD	5.83	5.68	5.75
MEAN	5.58	5.55	5.56

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77/R/B/3

GRAIN TONNES/HECTARE

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

RUST F / MILDEW F	NONE	BENODANI	MEAN
NONE	5.39	5.33	5.36
TRIDEMOR	5.77	5.77	5.77
MEAN	5.58	5.55	5.56

N TIME	SB		TD		SB/TD	
MILDEW F	NONE	TRIDEMOR	NONE	TRIDEMOR	NONE	TRIDEMOR
N RATE						
25	4.72	5.26	4.98	5.01	5.00	5.00
50	5.22	5.15	5.25	5.84	5.54	5.67
70	5.34	5.62	5.14	5.84	5.52	5.90
90	5.41	5.66	5.44	5.89	5.63	6.55
110	5.52	5.94	5.06	5.89	5.90	6.19
135	5.61	5.92	5.48	6.01	5.69	6.47

N TIME	SB		TD		SB/TD	
RUST F	NONE	BENODANI	NONE	BENODANI	NONE	BENODANI
N RATE						
25	5.16	4.82	5.21	4.79	4.85	5.15
50	5.17	5.20	5.69	5.40	5.82	5.39
70	5.55	5.41	5.57	5.41	5.79	5.63
90	5.35	5.72	5.56	5.76	6.28	5.90
110	5.67	5.78	5.33	5.63	6.12	5.97
135	5.54	5.99	5.62	5.87	6.13	6.03

MILDEW F	NONE		TRIDEMOR	
RUST F	NONE	BENODANI	NONE	BENODANI
N RATE				
25	4.97	4.82	5.16	5.02
50	5.48	5.19	5.64	5.47
70	5.33	5.34	5.95	5.63
90	5.56	5.43	5.91	6.16
110	5.45	5.54	5.97	6.05
135	5.54	5.65	5.99	6.28

MILDEW F	NONE		TRIDEMOR	
RUST F	NONE	BENODANI	NONE	BENODANI
N TIME				
SB	5.30	5.31	5.52	5.66
TD	5.23	5.23	5.77	5.73
SB/TD	5.64	5.45	6.02	5.91

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77/R/B/3

GRAIN TONNES/HECTARE

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

TABLE	N RATE	N TIME	MILDEW F	RUST F
SED	0.093	0.066	0.054	0.054

TABLE	N RATE N TIME	N RATE MILDEW F	N TIME MILDEW F	N RATE RUST F
SED	0.161	0.131	0.093	0.131

TABLE	N TIME RUST F	MILDEW F RUST F	N RATE N TIME MILDEW F	N RATE N TIME RUST F
SED	0.093	0.076	0.228	0.228

TABLE	N RATE MILDEW F RUST F	N TIME MILDEW F RUST F
SED	0.186	0.131

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

STRATUM	DF	SE	CV%
WP	10	0.228	4.1

GRAIN MEAN DM% 77.0

PLOT AREA HARVESTED 0.00195

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77/R/B/4

SPRING BARLEY

NITRIFICATION INHIBITORS AND FOLIAR DISEASES

Object: To study the effects of adding a nitrification inhibitor to a liquid nitrogen fertiliser on the incidence and control of foliar diseases, N uptake and yield - Long Hoos I/II.

Sponsors: J.F. Jenkyn, M.E. Finney, F.V. Widdowson, A. Penny, J. Ashworth.

Design: 2 randomised blocks of 6 plots split into 4.

Whole plot dimensions: 4.27 x 39.3.

Treatments: All combinations of:-

Whole plots

1. N RATE		Amounts of nitrogen fertiliser (kg N):
	70	
	110	
2. N FORM		Form of nitrogen fertiliser and nitrification inhibitor:
	LIQUID 0	Liquid fertiliser (urea/ammonium nitrate, 26% N), injected before sowing, no nitrification inhibitor
	LIQUID I	Liquid fertiliser (urea/ammonium nitrate, 26% N), injected before sowing, with sodium trithiocarbonate added as a nitrification inhibitor
	SOLID 0	Solid fertiliser ('Nitro-Chalk', 25% N) applied to seedbed, no nitrification inhibitor

Sub plots

3. MILDEW F		Mildew fungicide:
	NONE	None
	TRIDEMOR	Tridemorph on 20 June, 1977 and 13 July
4. RUST F		Rust fungicide:
	NONE	None
	BENODANI	Benodanil on 11 July

NOTES: (1) Fungicides were applied in 340 l:-
(a) Tridemorph at 0.53 kg
(b) Benodanil at 1.12 kg with 175 ml 'Citowett' as a wetter.
(2) Sides of plots were separated by a 2 m strip of Mazurka.
(3) Liquid nitrogen was applied by injectors with tines 30 cm apart 10 cm deep.
(4) Sodium trithiocarbonate was applied at 28 kg.
(5) Nitrogen fertiliser was applied on 4 Apr.

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Zephyr, sown at 160 kg.

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Cultivations, etc.:- Ploughed: 30 Sept, 1976. Spring-tine cultivated: 31 Mar, 1977. Power harrowed, seed sown: 5 Apr. Weedkillers applied: 26 May. Combine harvested: 27 Aug. Previous crops: Potatoes 1975, wheat 1976.

NOTE: Plant emergence counts were made. Mildew and brown rust were assessed during the season. Counts of ears and numbers of grains per ear were made. The crop was sampled for nitrogen determinations.

GRAIN TONNES/HECTARE

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

N FORM / N RATE	LIQUID 0	LIQUID I	SOLID 0	MEAN
70	5.49	5.53	5.27	5.43
110	5.53	5.52	5.49	5.51
MEAN	5.51	5.52	5.38	5.47

MILDEW F / N RATE	NONE	TRIDEMOR	MEAN
70	5.33	5.53	5.43
110	5.34	5.68	5.51
MEAN	5.34	5.61	5.47

MILDEW F / N FORM	NONE	TRIDEMOR	MEAN
LIQUID 0	5.36	5.65	5.51
LIQUID I	5.33	5.72	5.52
SOLID 0	5.32	5.45	5.38
MEAN	5.34	5.61	5.47

RUST F / N RATE	NONE	BENODANI	MEAN
70	5.38	5.48	5.43
110	5.52	5.51	5.51
MEAN	5.45	5.50	5.47

RUST F / N FORM	NONE	BENODANI	MEAN
LIQUID 0	5.50	5.52	5.51
LIQUID I	5.49	5.55	5.52
SOLID 0	5.35	5.42	5.38
MEAN	5.45	5.50	5.47

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GRAIN TONNES/HECTARE

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

RUST F	NONE	BENODANI	MEAN
MILDEW F			
NONE	5.34	5.33	5.34
TRIDEMOR	5.55	5.66	5.61
MEAN	5.45	5.50	5.47

N FORM	LIQUID 0		LIQUID I		SOLID 0	
MILDEW F	NONE	TRIDEMOR	NONE	TRIDEMOR	NONE	TRIDEMOR
N RATE						
70	5.43	5.55	5.32	5.74	5.23	5.31
110	5.29	5.76	5.34	5.69	5.40	5.59

N FORM	LIQUID 0		LIQUID I		SOLID 0	
RUST F	NONE	BENODANI	NONE	BENODANI	NONE	BENODANI
N RATE						
70	5.46	5.51	5.47	5.58	5.19	5.36
110	5.53	5.52	5.51	5.52	5.50	5.48

MILDEW F	NONE		TRIDEMOR	
RUST F	NONE	BENODANI	NONE	BENODANI
N RATE				
70	5.30	5.35	5.45	5.62
110	5.38	5.31	5.66	5.71

MILDEW F	NONE		TRIDEMOR	
RUST F	NONE	BENODANI	NONE	BENODANI
N FORM				
LIQUID 0	5.43	5.30	5.57	5.74
LIQUID I	5.32	5.33	5.66	5.77
SOLID 0	5.27	5.37	5.42	5.48

	MILDEW F	NONE		TRIDEMOR	
	RUST F	NONE	BENODANI	NONE	BENODANI
N RATE	N FORM				
70	LIQUID 0	5.48	5.37	5.45	5.64
	LIQUID I	5.29	5.35	5.66	5.81
	SOLID 0	5.14	5.32	5.23	5.39
110	LIQUID 0	5.37	5.22	5.70	5.83
	LIQUID I	5.36	5.31	5.66	5.73
	SOLID 0	5.39	5.41	5.61	5.56

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GRAIN TONNES/HECTARE

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

TABLE	N RATE	N FORM	MILDEW F	RUST F
SED	0.031	0.038	0.038	0.038

TABLE	N RATE N FORM	N RATE MILDEW F	N FORM MILDEW F	N RATE RUST F
SED	0.053	0.049	0.060	0.049
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
N RATE		0.054		0.054
N FORM			0.066	

TABLE	N FORM RUST F	MILDEW F RUST F	N RATE N FORM MILDEW F	N RATE N FORM RUST F
SED	0.060	0.054	0.085	0.085
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
N FORM	0.066			
N RATE.N FORM			0.094	0.094

TABLE	N RATE MILDEW F RUST F	N FORM MILDEW F RUST F	N RATE N FORM MILDEW F RUST F
SED	0.073	0.090	0.127
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N RATE	0.077		
N FORM		0.094	
N RATE.N FORM			0.133

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.053	1.0
BLOCK.WP.SP	18	0.133	2.4

GRAIN MEAN DM% 75.4

PLOT AREA HARVESTED 0.00195

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77/R/B/5

SPRING BARLEY

MIXED VARIETIES AND MILDEW

Object: To study mildew development and yield of variety mixtures sown at different seed rates, with and without a fungicidal seed dressing - Delafield.

Sponsor: J.F. Jenkyn.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 9.14.

Treatments: All combinations of:-

1. VAR SR — Varieties and seed rates:

HASSAN 2	Hassan, sown at 160 kg
MIDAS 2	Midas, sown at 160 kg
WING 2	Wing, sown at 160 kg
MIXED 1	Equal parts of the three varieties mixed and sown at 80 kg
MIXED 2	Equal parts of the three varieties mixed and sown at 160 kg
MIXED 3	Equal parts of the three varieties mixed and sown at 240 kg

2. FUNGCIDE — Systemic fungicidal seed dressing:

NONE	None
ETHIRIMO	Ethirimol at 15 g per 100 kg seed

NOTE: All plots were separated and surrounded by 12 m of variety Proctor, seed dressed ethirimol at 45 g per 100 kg seed, sprayed tridemorph at 0.53 kg in 340 l on 12 July, 1977. Yields were taken from this crop, adjacent to plots, and used for covariance analysis.

Basal applications: Manures: (20:14:14) at 380 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil ('MAC CMPP' at 2.8 l with 'Oxytril CM' at 1.1 l in 220 l).

Cultivations, etc.:- Ploughed: 27 Oct, 1976. Spring-tine cultivated: 10 Mar, 1977. Sown: 12 Mar. Weedkillers applied: 24 May. Combine harvested: 5 Sept. Previous crops: Beans 1975, wheat 1976.

NOTE: Seedling emergence counts were made. Mildew was assessed on three occasions. Ear counts were made in August.

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GRAIN TONNES/HECTARE

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

VAR SR FUNGCIDE	HASSAN 2	MIDAS 2	WING 2	MIXED 1	MIXED 2	MIXED 3	MEAN
NONE	4.09	4.70	4.38	4.45	4.52	4.57	4.45
ETHIRIMO	3.92	5.03	4.44	4.40	4.42	4.78	4.50
MEAN	4.00	4.86	4.41	4.43	4.47	4.68	4.47

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

TABLE	FUNGCIDE	VAR SR	FUNGCIDE VAR SR
SED	0.046	0.081	0.114

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

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.137	3.1

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00260

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77/R/B/6

SPRING BARLEY

SOWING DATES AND PATHOGEN CONTROL

Object: To study the effects of aphid, virus and fungus control on pathogens and yield of barley sown on two dates - Summerdells II.

Sponsors: R.T. Plumb, J.F. Jenkyn.

Design: 3 blocks of 2 x 2 x 2 x 2, randomisation restricted.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

1. SOW DATE Dates of sowing:

   8 MAR 8 March, 1977
   25 APR 25 April

2. FUNGCIDE Fungicide:

   NONE None
   E+T Ethirimol seed dressing; tridemorph spray

3. APHICIDE(1) Aphicide to seedbed:

   NONE None
   PHORATE Phorate at 5 kg as granules

4. APHICIDE(2) Aphicide on 29 June:

   NONE None
   MENAZON Menazon ('Saphi-col' at 0.7 in 340 l)

NOTE: Tridemorph applied at 0.53 kg in 340 l on 22 June.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled to SOW DATE 8 MAR. (20:14:14) at 188 kg, combine drilled plus (20:14:14) at 235 kg broadcast after sowing to SOW DATE 25 APR. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Ploughed: 15 Oct, 1976. Spring-tine cultivated: 7 Mar, 1977. Power harrowed for early sowing: 8 Mar. Power harrowed for late sowing: 25 Apr. Weedkillers applied: 26 May. Combine harvested: 27 Aug. Previous crops: Winter oats 1975 and 1976.

NOTE: Emergence counts were made for both sowings. Mildew was assessed on two occasions. Aphid counts were made on seven occasions and virus scores twice. Tiller counts were made once and grains per ear counted at harvest.

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GRAIN TONNES/HECTARE

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

FUNGCIDE SOW DATE	NONE	E+T	MEAN
8 MAR	5.84	5.87	5.86
25 APR	5.79	6.59	6.19
MEAN	5.81	6.23	6.02

APHICIDE(1) SOW DATE	NONE	PHORATE	MEAN
8 MAR	5.76	5.95	5.86
25 APR	5.88	6.49	6.19
MEAN	5.82	6.22	6.02

APHICIDE(1) FUNGCIDE	NONE	PHORATE	MEAN
NONE	5.60	6.02	5.81
E+T	6.04	6.42	6.23
MEAN	5.82	6.22	6.02

APHICIDE(2) SOW DATE	NONE	MENAZON	MEAN
8 MAR	5.80	5.91	5.86
25 APR	6.21	6.16	6.19
MEAN	6.01	6.03	6.02

APHICIDE(2) FUNGCIDE	NONE	MENAZON	MEAN
NONE	5.80	5.83	5.81
E+T	6.22	6.24	6.23
MEAN	6.01	6.03	6.02

APHICIDE(2) APHICIDE(1)	NONE	MENAZON	MEAN
NONE	5.83	5.81	5.82
PHORATE	6.18	6.26	6.22
MEAN	6.01	6.03	6.02

FUNGCIDE	NONE		E+T	
APHICIDE(1) SOW DATE	NONE	PHORATE	NONE	PHORATE
8 MAR	5.73	5.94	5.79	5.95
25 APR	5.47	6.10	6.28	6.89

FUNGCIDE	NONE		E+T	
APHICIDE(2) SOW DATE	NONE	MENAZON	NONE	MENAZON
8 MAR	5.80	5.88	5.81	5.94
25 APR	5.80	5.77	6.62	6.55

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GRAIN TONNES/HECTARE

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

APHICIDE(1)	NONE		PHORATE	
APHICIDE(2)	NONE	MENAZON	NONE	MENAZON
SOW DATE				
8 MAR	5.79	5.74	5.82	6.08
25 APR	5.87	5.89	6.55	6.44

APHICIDE(1)	NONE		PHORATE	
APHICIDE(2)	NONE	MENAZON	NONE	MENAZON
FUNGCIDE				
NONE	5.59	5.62	6.01	6.03
E+T	6.07	6.00	6.36	6.48

APHICIDE(1)		NONE		PHORATE	
APHICIDE(2)		NONE	MENAZON	NONE	MENAZON
SOW DATE	FUNGCIDE				
8 MAR	NONE	5.76	5.70	5.83	6.06
	E+T	5.81	5.77	5.81	6.10
25 APR	NONE	5.41	5.54	6.19	6.01
	E+T	6.33	6.23	6.91	6.87

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

TABLE	SOW DATE	FUNGCIDE	APHICIDE(1)	APHICIDE(2)
SED	0.086	0.086	0.086	0.086

TABLE	SOW DATE FUNGCIDE	SOW DATE APHICIDE(1)	FUNGCIDE APHICIDE(1)	SOW DATE APHICIDE(2)
SED	0.122	0.122	0.122	0.122

TABLE	FUNGCIDE APHICIDE(2)	APHICIDE(1) APHICIDE(2)	SOW DATE FUNGCIDE APHICIDE(1)	SOW DATE FUNGCIDE APHICIDE(2)
SED	0.122	0.122	0.173	0.173

TABLE	SOW DATE APHICIDE(1) APHICIDE(2)	FUNGCIDE APHICIDE(1) APHICIDE(2)	SOW DATE FUNGCIDE APHICIDE(1) APHICIDE(2)
SED	0.173	0.173	0.244

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

STRATUM	DF	SE	CV%
BLOCK.WP	30	0.299	5.0

GRAIN MEAN DM% 79.3

PLOT AREA HARVESTED 0.00260

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77/R/B/7

SPRING BARLEY

MILDEW CONTROL IN A SERIALLY BALANCED DESIGN

Object: To study the effects of fungicide sprays applied at different times and the effects of interference between plots on the incidence of mildew and on yield - Gt. Harpenden II.

Sponsors: J.F. Jenkyn, A. Bainbridge, G.V. Dyke.

Design: 9 'blocks' of 4 plots (+ 2 flanking plots).

Whole plot dimensions: 4.27 x 9.14

Treatments:

FUNGTIME	Times of applying a single spray of tridemorph fungicide:
1	On 31 May
2	On 9 June
3	On 20 June
4	On 5 July

NOTES: (1) Treatments were applied to 38 plots in one line on the field in an order such that each of the 36 possible sets of 3 adjacent treatments occurred exactly once (but omitting sets with the same treatment on 2 successive plots). The effects of treatments to neighbouring plots (lefthand neighbour - LHN, righthand neighbour - RHN) are estimated in the analysis.
In this experiment 'left' was west, 'right' was east.
The analysis presented assumes a Fourier curve with 4 terms, 2 sine and 2 cosine to represent positional variation.
(2) Tridemorph was applied at 0.53 kg in 340 l.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l).

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated: 22 Sept, 1976. Heavy spring-tine cultivated: 28 Sept. Ploughed: 18 Nov. Spring-tine cultivated and seed sown: 10 Mar, 1977. Weedkillers applied: 18 May. Combine harvested: 30 Aug. Previous crops: Potatoes 1975, barley 1976.

NOTE: Seedling emergence counts were made. Mildew was assessed on two occasions.

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GRAIN TONNES/HECTARE

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

GRAND MEAN 6.03

FUNGTIME	1	2	3	4
	6.19	6.07	5.91	5.95

LHN FUNGTIME	1	2	3	4
1		6.02	6.28	6.26
2	6.08		6.00	6.14
3	5.93	5.92		5.87
4	5.86	5.87	6.11	

RHN FUNGTIME	1	2	3	4
1		6.13	6.28	6.15
2	6.02		6.11	6.08
3	5.91	5.81		6.00
4	5.94	5.92	5.98	

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

TABLE	FUNGTIME	FUNGTIME LHN	FUNGTIME RHN
SED	0.076	0.224	0.225

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

STRATUM	DF	SE	CV%
WP	12	0.160	2.7

GRAIN MEAN DM% 82.3

PLOT AREA HARVESTED 0.00195

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77/R/B/8

SPRING BARLEY

EFFECTS OF MILDEW SOURCES ON DISEASE CONTROL

Object: To study the effects of nearby sources of mildew on control by fungicides applied at a range of times - Black Horse I.

Sponsors: J.F. Jenkyn, A. Bainbridge.

Design: 3 randomised blocks of 3 plots split into 6.

Whole plot dimensions: 22.9 x 29.9.

Treatments: All combinations of:-

Whole plots

1. MILDSRCE Mildew source:

NONE	None (seed treated ethirimol, crop sprayed tridemorph, on 9 June, 1977, 4 July)
EARLY	Early (tridemorph only on 9 June, 4 July)
FULL	Full (no mildew control)

Sub plots

2. MILDCONT Times of applying mildew control:

ED	Ethirimol seed dressing
	Tridemorph spray on:
T S 1	31 May
T S 2	9 June
T S 3	20 June
T S 4	24 June
T S 5	29 June

NOTES: (1) The whole plot treatments were applied to a strip of crop 6.4 m wide at the ends of all sub plots. There were no discards between sub plots (0.6 m fallow paths only). Whole plots and the sides of sets of six sub plots were separated by strips of crop 17 m wide, seed treated ethirimol, crop sprayed tridemorph at 0.53 kg in 340 l on 4 July.

(2) Treatment tridemorph sprays were applied at 0.53 kg in 340 l.

Basal applications: Manures: (20:14:14) at 470 kg, combine drilled. Weedkillers: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 220 l.

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Ploughed: 14 Oct, 1976. Spring-tine cultivated: 4 Mar, 1977. Seed sown: 7 Mar. Weedkillers applied: 15 May. Combine harvested: 26 Aug. Previous crops: Barley 1975 and 1976.

NOTE: Seedling counts were made and mildew was assessed on two occasions.

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GRAIN TONNES/HECTARE

SUBPLOTS

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

MILDCONT MILDSRCE	ED	T S 1	T S 2	T S 3	T S 4	T S 5	MEAN
NONE	5.73	5.81	5.78	5.86	5.84	5.40	5.73
EARLY	4.97	5.49	5.71	5.23	5.27	5.11	5.30
FULL	5.53	5.96	5.57	5.59	5.75	5.26	5.61
MEAN	5.41	5.75	5.69	5.56	5.62	5.26	5.55

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

TABLE	MILDSRCE	MILDCONT	MILDSRCE MILDCONT
SED	0.191	0.155	0.311
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MILDSRCE			0.269

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.234	4.2
BLOCK.WP.SP	30	0.329	5.9

GRAIN MEAN DM% 79.1

SUB PLOT AREA HARVESTED 0.00163

WHOLE PLOTS

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

MILDSRCE	NONE	EARLY	FULL	MEAN
	5.64	5.13	5.22	5.33

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

TABLE	MILDSRCE
SED	0.095

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.116	2.2

GRAIN MEAN DM% 77.6

PLOT AREA HARVESTED 0.00611

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77/R/B/9

SPRING BARLEY

MILDEW TOLERANCE TO ETHIRIMOL

Object: To study the effects of a range of rates of ethirimol seed dressing on mildew tolerance and yield of barley - Garden Plot 8.

Sponsor: D.W. Hollomon.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 2.40 x 5.18.

Treatments:

ETHIRIMO Ethirimol seed dressing (g/kg of seed):

0
1
4
16

NOTE: Surrounds were sown to Proctor sprayed with tridemorph at 0.53 kg in 340 l on 23 June.

Basal applications: Manures: (0:14:28) at 970 kg. 'Nitro-Chalk' at 450 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 5.6 l in 340 l).

Seed: Proctor, sown at 160 kg.

Cultivations, etc.:- PK applied: 13 Dec, 1976. Ploughed: 7 Mar, 1977. Power harrowed and seed sown: 8 Apr. N applied: 13 Apr. Weedkillers applied: 31 May. Combine harvested: 30 Aug. Previous crops: Spring wheat 1975, lupins 1976.

NOTES: (1) Plots were inoculated with six separate strains of powdery mildew, ranging in ethirimol-sensitivity from none to great.
(2) Mildew and its race composition and ethirimol tolerance were assessed during the season.

GRAIN TONNES/HECTARE

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

ETHIRIMO	0	1	4	16	MEAN
	5.38	4.32	5.03	5.18	4.98

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

TABLE	ETHIRIMO
SED	0.367

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.450	9.0

GRAIN MEAN DM% 81.3
PLOT AREA HARVESTED 0.00050

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77/R/B/12

SPRING BARLEY

PRECISION SEEDING

Object: To study the effects of precision sowing, row spacing, seed rate, irrigation and nitrogen on yield - Gt. Knott III.

Sponsors: P.J. Welbank, F.V. Widdowson, G.N. Thorne, J.P. Dickinson.

Design: Single replicate of 60 plots.

Whole plot dimensions: 4.88 x 8.23.

Treatments: All combinations of:-

1. DRILL — Drills used for sowing:

   STANHAY — Stanhay precision drill
   NORDSTEN — Nordsten standard drill

2. ROW SPAC — Spacing between rows cm:

   10.5
   21.0

3. SEEDRATE — Seed rates (kg):

   57
   114

4. IRRIGTN — Irrigation by trickle lines:

   NONE — None
   FULL — Full (145 mm)

5. N — Amounts of nitrogen fertiliser (kg N):

   75
   100
   125

plus all combinations of:-

1. H S57 IF — Hand sown at 57 kg seed rate with full irrigation:

   10 x 5 — Seed sown 10.5 cm x 5.1 cm
   7 x 7 — Seed sown 7.3 cm x 7.3 cm

2. N — Amounts of nitrogen fertiliser (kg N):

   75
   100
   125

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plus six extra plots:-

F18 114 Sown by Farm drill (Silsoe 12-row), 18 cm (7 inches) spacing between rows, sown at 114 kg seed rate, no irrigation given, six amounts of nitrogen fertiliser (kg N):

N 0
N 75
N 100
N 125
N 150
N 175

NOTES: (1) Irrigation was applied on 7 July (117 mm) and 26 July (28 mm).
(2) The performance of the Nordsten and Farm (Silsoe) drills was unusually poor because of a difficult plot layout. Seed was shallowly sown and there was much damage by birds at the seedbed stage. The yields reported from these treatments should not be regarded as typical.

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 340 l.

Seed: Ark Royal.

Cultivations, etc.:- Deep-tine cultivated: 10 Dec, 1976. PK applied, rotary harrowed: 9 Mar, 1977. Heavy deep-tine cultivated: 8 Apr. Spike rotary cultivated: 20 Apr. Seed sown: 22 Apr. Test N applied: 23 May. Weedkillers applied: 8 June. Fungicide applied: 22 June. Combine harvested: 16 Sept. Previous crops: Winter oats 1975, potatoes 1976.

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77/R/B/12

GRAIN TONNES/HECTARE

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

ROW SPAC	10.5	21.0	MEAN
DRILL			
STANHAY	3.54	3.32	3.43
NORDSTEN	2.75	2.76	2.75
MEAN	3.15	3.04	3.09

SEEDRATE	57	114	MEAN
DRILL			
STANHAY	3.27	3.59	3.43
NORDSTEN	2.54	2.97	2.75
MEAN	2.90	3.28	3.09

SEEDRATE	57	114	MEAN
ROW SPAC			
10.5	2.92	3.38	3.15
21.0	2.89	3.19	3.04
MEAN	2.90	3.28	3.09

IRRIGTN	NONE	FULL	MEAN
DRILL			
STANHAY	3.58	3.27	3.43
NORDSTEN	2.70	2.80	2.75
MEAN	3.14	3.04	3.09

IRRIGTN	NONE	FULL	MEAN
ROW SPAC			
10.5	3.08	3.21	3.15
21.0	3.20	2.87	3.04
MEAN	3.14	3.04	3.09

IRRIGTN	NONE	FULL	MEAN
SEEDRATE			
57	2.88	2.92	2.90
114	3.40	3.16	3.28
MEAN	3.14	3.04	3.09

N	75	100	125	MEAN
DRILL				
STANHAY	3.60	3.42	3.26	3.43
NORDSTEN	2.89	2.75	2.62	2.75
MEAN	3.25	3.09	2.94	3.09

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77/R/B/12

GRAIN TONNES/HECTARE

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

N	75	100	125	MEAN
ROW SPAC				
10.5	3.40	3.13	2.91	3.15
21.0	3.09	3.05	2.97	3.04
MEAN	3.25	3.09	2.94	3.09

N	75	100	125	MEAN
SEEDRATE				
57	3.08	2.85	2.77	2.90
114	3.41	3.33	3.10	3.28
MEAN	3.25	3.09	2.94	3.09

N	75	100	125	MEAN
IRRIGTN				
NONE	3.25	3.17	3.01	3.14
FULL	3.24	3.01	2.86	3.04
MEAN	3.25	3.09	2.94	3.09

ROW SPAC	10.5		21.0	
SEEDRATE	57	114	57	114
DRILL				
STANHAY	3.39	3.69	3.14	3.49
NORDSTEN	2.44	3.06	2.63	2.88

ROW SPAC	10.5		21.0	
IRRIGTN	NONE	FULL	NONE	FULL
DRILL				
STANHAY	3.62	3.46	3.55	3.08
NORDSTEN	2.55	2.95	2.86	2.66

SEEDRATE	57		114	
IRRIGTN	NONE	FULL	NONE	FULL
DRILL				
STANHAY	3.36	3.18	3.81	3.37
NORDSTEN	2.41	2.66	3.00	2.94

SEEDRATE	57		114	
IRRIGTN	NONE	FULL	NONE	FULL
ROW SPAC				
10.5	2.81	3.03	3.36	3.39
21.0	2.96	2.81	3.44	2.93

ROW SPAC	10.5			21.0		
N	75	100	125	75	100	125
DRILL						
STANHAY	3.69	3.61	3.32	3.51	3.24	3.20
NORDSTEN	3.10	2.65	2.50	2.67	2.86	2.74

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77/R/B/12

GRAIN TONNES/HECTARE

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

SEEDRATE	57			114		
N	75	100	125	75	100	125
DRILL						
STANHAY	3.47	3.13	3.21	3.74	3.72	3.31
NORDSTEN	2.69	2.57	2.34	3.08	2.94	2.90

SEEDRATE	57			114		
N	75	100	125	75	100	125
ROW SPAC						
10.5	3.27	2.72	2.76	3.53	3.54	3.06
21.0	2.89	2.98	2.78	3.29	3.12	3.15

IRRIGTN	NONE			FULL		
N	75	100	125	75	100	125
DRILL						
STANHAY	3.72	3.60	3.43	3.49	3.25	3.08
NORDSTEN	2.78	2.74	2.60	2.99	2.77	2.64

IRRIGTN	NONE			FULL		
N	75	100	125	75	100	125
ROW SPAC						
10.5	3.38	3.08	2.80	3.42	3.18	3.02
21.0	3.12	3.25	3.23	3.06	2.85	2.70

IRRIGTN	NONE			FULL		
N	75	100	125	75	100	125
SEEDRATE						
57	2.88	2.93	2.83	3.28	2.76	2.72
114	3.62	3.40	3.20	3.20	3.26	3.00

EXTRA PLOTS

N	75	100	125	MEAN
H S57 IF				
10 X 5	3.10	3.14	3.09	3.11
7 X 7	3.47	3.36	2.47	3.10
MEAN	3.28	3.25	2.78	3.10

F18 114	N 0	N 75	N 100	N 125	N 150	N 175	MEAN
	2.46	3.85	3.25	3.63	3.25	2.79	3.21

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77/R/B/12

GRAIN TONNES/HECTARE

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

TABLE	DRILLS	ROW SPAC	SEEDRATE	IRRIGTN
SED	0.134	0.134	0.134	0.134

TABLE	N	DRILLS ROW SPAC	DRILLS SEEDRATE	ROW SPAC SEEDRATE
SED	0.164	0.190	0.190	0.190

TABLE	DRILLS IRRIGTN	ROW SPAC IRRIGTN	SEEDRATE IRRIGTN	DRILLS N
SED	0.190	0.190	0.190	0.232

TABLE	ROW SPAC N	SEEDRATE N	IRRIGTN N	DRILLS ROW SPAC SEEDRATE
SED	0.232	0.232	0.232	0.268

TABLE	DRILLS ROW SPAC IRRIGTN	DRILLS SEEDRATE IRRIGTN	ROW SPAC SEEDRATE IRRIGTN	DRILLS ROW SPAC N
SED	0.268	0.268	0.268	0.328

TABLE	DRILLS SEEDRATE N	ROW SPAC SEEDRATE N	DRILLS IRRIGTN N	ROW SPAC IRRIGTN N
SED	0.328	0.328	0.328	0.328

TABLE	SEEDRATE IRRIGTN N
SED	0.328

EXTRA PLOTS STANDARD ERRORS ARE ESTIMATED FROM THE ERRORS OF THE MAIN FACTORIAL SECTION

TABLE	N	H S57 IF	F18 114	H S57 IF N
SED	0.464	0.379	0.657	0.657

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

STRATUM	DF	SE	CV%
WP	11	0.464	15.0

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00111

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77/R/O/1

WINTER OATS

SOWING DATES AND INSECTICIDES

Object: To study the effects of dates of sowing and times of applying insecticides on the incidence of cereal aphids, barley yellow dwarf virus (BYDV) and yield of winter oats - Whittlocks.

Sponsor: R.T. Plumb.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

1. SOW DATE Sowing dates:

16 SEP	16 September, 1976
2 NOV	2 November, 1976
3 DEC	3 December, 1976

2. INSCTCDE(1) Phorate granules to seedbed:

NONE	None
PHORATE	Phorate at 5 kg

3. INSCTCDE(2) Menazon spray:

NONE	None
MENAZON	Menazon (0.7 l 'Saphi-Col' in 300 l on 2 June, 1977).

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 310 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l) applied in spring. Paraquat at 6.7 kg ion in 380 l.

Seed: Peniarth, sown at 190 kg.

Cultivations, etc.:- Deep-tine cultivated: 24 Aug, 1976, 2 Sept. Spring-tine cultivated: 8 Sept. Power harrowed for first sowing: 13 Sept. Paraquat applied to second sowing plots and these plots spring-tine cultivated: 21 Oct. Paraquat applied to third sowing plots: 26 Nov. Rotary harrowed for third sowing: 3 Dec. N applied: 14 Apr, 1977. Spring weedkillers applied: 4 May. Combine harvested: 28 Aug. Previous crops: Wheat 1975, barley 1976.

NOTE: Plant emergence, aphid and virus counts were made during the season. Tiller counts were made before harvest and grains per ear at harvest.

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77/R/O/1

GRAIN TONNES/HECTARE

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

INSCTCDE(1)	NONE	PHORATE	MEAN
SOW DATE			
16 SEP	5.72	5.53	5.62
2 NOV	5.05	5.24	5.15
3 DEC	5.36	5.25	5.30
MEAN	5.38	5.34	5.36

INSCTCDE(2)	NONE	MENAZON	MEAN
SOW DATE			
16 SEP	5.84	5.40	5.62
2 NOV	5.21	5.08	5.15
3 DEC	5.33	5.28	5.30
MEAN	5.46	5.25	5.36

INSCTCDE(2)	NONE	MENAZON	MEAN
INSCTCDE(1)			
NONE	5.52	5.23	5.38
PHORATE	5.41	5.27	5.34
MEAN	5.46	5.25	5.36

INSCTCDE(1)	NONE		PHORATE	
INSCTCDE(2)	NONE	MENAZON	NONE	MENAZON
SOW DATE				
16 SEP	5.84	5.59	5.84	5.22
2 NOV	5.19	4.91	5.23	5.25
3 DEC	5.51	5.20	5.14	5.36

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

TABLE	SOW DATE	INSCTCDE(1)	INSCTCDE(2)	SOW DATE INSCTCDE(1)
SED	0.190	0.155	0.155	0.269

TABLE	SOW DATE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	SOW DATE INSCTCDE(1) INSCTCDE(2)
SED	0.269	0.220	0.380

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.466	8.7

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00260

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77/R/BE/1

WINTER BEANS

CROP DENSITY AND CHOCOLATE SPOT

Object: To study the effects of irrigation, plant density and benomyl on Chocolate Spot (Botrytis spp.) and yield of winter beans - Fosters Corner.

Sponsor: A. Bainbridge, M.E. Finney.

Design: 2 randomised blocks of 12 plots (with IRRIGTN on blocks)

Whole plot dimensions: 5.33 x 9.14.

Treatments: All combinations of:-

Blocks

1.	IRRIGTN	Irrigation:
	NONE	None
	FULL	Full (100 mm)

Plots

2.	FUNGTIME	Times of applying benomyl (at 0.56 kg in 340 l on each occasion):
	NEVER	Never
	ONCE	Once, on 30 May, 1977
	TWICE	Twice, on 30 May and 21 June
3.	SEEDRATE	Seed rates (kg):
	126	
	378	
4.	SPACING	Spacing between rows:
	18 CM	18 cm (7 inches)
	53 CM	53 cm (21 inches)

NOTE: 25 mm of irrigation to IRRIGTN FULL plots was supplied on each of the following dates:- 27 June, 12 July, 15 July, 22 July.

Basal applications: Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Throws MS.

Cultivations, etc.:- Deep-tine cultivated: 31 Aug, 1976, 3 Sept. Heavy spring-tine cultivated: 21, 22 Sept, 3 Nov. Seed sown: 3 Nov. Spring-tine cultivated: 4 Nov. Weedkiller applied: 15 Apr, 1977. Combine harvested: 14 Sept. Previous crops: Spring wheat 1975, barley 1976.

NOTE: Counts were made of seedling emergence, percentage leaf area affected by Botrytis spp, stems per row, pods per stem and leaf roll virus infected plants.

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77/R/BE/1

GRAIN TONNES/HECTARE

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

FUNGTIME IRRIGTN	NEVER	ONCE	TWICE	MEAN
NONE	3.55	3.90	4.42	3.96
FULL	3.15	3.82	3.21	3.39
MEAN	3.35	3.86	3.81	3.67

SEEDRATE IRRIGTN	126	378	MEAN
NONE	3.49	4.43	3.96
FULL	3.21	3.57	3.39
MEAN	3.35	4.00	3.67

SEEDRATE FUNGTIME	126	378	MEAN
NEVER	3.10	3.61	3.35
ONCE	3.62	4.09	3.86
TWICE	3.33	4.30	3.81
MEAN	3.35	4.00	3.67

SPACING IRRIGTN	18 CM	53 CM	MEAN
NONE	3.81	4.10	3.96
FULL	3.07	3.71	3.39
MEAN	3.44	3.91	3.67

SPACING FUNGTIME	18 CM	53 CM	MEAN
NEVER	3.27	3.43	3.35
ONCE	3.51	4.21	3.86
TWICE	3.55	4.08	3.81
MEAN	3.44	3.91	3.67

SPACING SEEDRATE	18 CM	53 CM	MEAN
126	3.02	3.68	3.35
378	3.86	4.14	4.00
MEAN	3.44	3.91	3.67

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77/R/BE/1

GRAIN TONNES/HECTARE

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

FUNGTIME	NEVER		ONCE		TWICE	
SEEDRATE	126	378	126	378	126	378
IRRIGTN						
NONE	3.17	3.93	3.44	4.36	3.86	4.99
FULL	3.02	3.29	3.81	3.83	2.81	3.60

FUNGTIME	NEVER		ONCE		TWICE	
SPACING	18 CM	53 CM	18 CM	53 CM	18 CM	53 CM
IRRIGTN						
NONE	3.40	3.70	3.88	3.91	4.15	4.70
FULL	3.15	3.16	3.13	4.50	2.94	3.47

SEEDRATE	126		378	
SPACING	18 CM	53 CM	18 CM	53 CM
IRRIGTN				
NONE	3.25	3.72	4.37	4.48
FULL	2.79	3.64	3.36	3.79

SEEDRATE	126		378	
SPACING	18 CM	53 CM	18 CM	53 CM
FUNGTIME				
NEVER	2.89	3.31	3.66	3.56
ONCE	3.20	4.04	3.81	4.38
TWICE	2.98	3.69	4.12	4.47

	SEEDRATE	126		378	
	SPACING	18 CM	53 CM	18 CM	53 CM
IRRIGTN	FUNGTIME				
NONE	NEVER	2.81	3.52	3.99	3.88
	ONCE	3.61	3.26	4.15	4.57
	TWICE	3.34	4.38	4.97	5.01
FULL	NEVER	2.96	3.09	3.33	3.24
	ONCE	2.80	4.82	3.47	4.19
	TWICE	2.61	3.00	3.27	3.94

GRAIN MEAN DM% 75.7

SUB PLOT AREA HARVESTED 0.00279

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77/R/BE/4

SPRING BEANS

APHIDS AND ENTOMOPHTHORA

Object: To study the effects of the fungus Entomophthora on aphid populations and yield of field beans - Geescroft.

Sponsor: N. Wilding.

Design: 5 randomised blocks of 5 plots.

Whole plot dimensions: 9.22 x 9.14.

Treatments:

TREATMNT	Control of insects and fungi:
NONE	None
INSCTCDE	Insecticide: Pirimicarb at 0.14 kg in 340 l on 4 July
FUNG C	Fungicide: Captafol at 1.4 kg on the first and third occasions and at 1.7 kg on the second, fourth and fifth occasions
FUNG M	Fungicide: Mancozeb at 1.3 kg on 5 occasions
ENTAPHID	Entomophthora spp. applied in live infected aphids on 20 June, 1977

NOTES: (1) Fungicides were applied in 340 l on 4 July, 14 July, 21 July, 27 July and 4 August.
(2) Yields were adjusted for a fertility trend across the site.

Basal applications: Manures: Chalk at 7.5 t. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 2 Sept, 1976. Ploughed: 9 Sept. Heavy spring-tine cultivated four times: 21 Sept, 22 Sept, 3 Nov, 8 Mar, 1977. Seed sown: 9 Mar. Weedkiller applied: 4 Apr. Combine harvested: 30 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Weekly assessments were made of aphid population density and proportion of infected aphids infected with entomophthora. Total above-ground dry matter was measured in August.

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77/R/BE/4

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	INSCTCDE	FUNG C	FUNG M	ENTAPHID	MEAN
	0.81	4.03	0.49	0.63	2.10	1.61

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

TABLE	TREATMNT
SED	0.173

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.270	16.8

GRAIN MEAN DM% 80.2

PLOT AREA HARVESTED 0.00239

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77/R/BE/5

SPRING BEANS

CONTROL OF STEM EELWORM

Object: To study the effects of thiabendazole and aldicarb on stem eelworm (Ditylenchus dipsaci) and yield - Highfield O & E III.

Sponsor: D.J. Hooper.

Design: 3 randomised blocks of 8 plots

Whole plot dimensions: 2.54 x 9.14.

Treatments:

NEMACIDE	Nematicides:
NONE	None (Duplicated)
	Thiabendazole granules (kg a.i.) placed in the row at sowing:-
TH G 3	3
TH G 6	6
TH G 12	12
	Seed dressed with thiabendazole wettable powder (kg a.i.):-
TH S 2.7	2.7
TH S 5.4	5.4
	Aldicarb granules (kg a.i.) in the row at sowing:-
AL G 5	5

NOTE: Many germinating seeds were destroyed by pigeons. The inadvertent omission of weedkiller led to serious weed infestation. Damage from these two causes was so severe that one of the blocks had to be abandoned.

Basal applications: Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Ploughed: 7 Sept, 1976. Rotary cultivated: 5 Apr, 1977. Seed sown: 19 Apr. Tractor hoed: 20 June. Insecticide applied: 19 July. Combine harvested: 29 Sept. Previous crops: Beans 1975 and 1976.

NOTE: Stem height and numbers of stems infected with stem eelworm were assessed during the season. The percentage of infected seed was assessed after harvest.

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77/R/BE/5

GRAIN TONNES/HECTARE

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

NEMACIDE	
NONE	0.44
TH G 3	0.50
TH G 6	0.74
TH G 12	0.72
TH S 2.7	1.04
TH S 5.4	0.88
AL G 5	1.61
MEAN	0.80

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

TABLE	NEMACIDE	
SED	0.306	MIN REP
	0.265	MAX-MIN

	NEMACIDE
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.306	38.3

GRAIN MEAN DM% 66.8

PLOT AREA HARVESTED 0.00232

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77/R/BE/6

SPRING BEANS

DRILLS AND PLANT POPULATIONS

Object: To study the effects of precision sowing, seed rate and pathogen control on yields and incidence of pests and diseases - Pastures.

Sponsors: R. Bardner, A.J. Cockbain, J.M. Day, J.P. Dickinson, K.E. Fletcher, J. McEwen, R.J. Roughley, G.A. Salt, J.F. Witty.

Design: 2 randomised blocks of 2 plots split into 15 sub plots with a further 11 sub plots, for sampling only, duplicating certain of the treatments.

Whole plot dimensions: 8.23 x 119.

Treatments: All combinations of:-

Whole plots

1. PATHCONT — Pathogen control:

STANDARD	Standard, aphicide only
ENHANCED	Aldicarb to seedbed at 10 kg on 6 Apr, 1977 + aphicide

Sub plots

2. DRILL — Drills, plant spacings and populations:

	Drill	Spacing between rows	Spacing within rows	Target population	Population achieved
MF 18 4	Massey-Ferguson	18 cm (7 ins)	Random	500,000	524,000
MF 18 2	Massey-Ferguson	18 cm (7 ins)	Random	250,000	311,000
MF 53 4	Massey-Ferguson	53 cm (21 ins)	Random	500,000	398,000
MF 53 2	Massey-Ferguson	53 cm (21 ins)	Random	250,000	230,000
NG 36 4	Nodet-Gongis	36 cm (14 ins)	7.7 cm	500,000	408,000
NG 36 2	Nodet-Gongis	36 cm (14 ins)	15.4 cm	250,000	252,000
NG 53 4	Nodet-Gongis	53 cm (21 ins)	3.8 cm	500,000	103,000
NG 53 2	Nodet-Gongis	53 cm (21 ins)	7.7 cm	250,000	217,000
NG 53 1	Nodet-Gongis	53 cm (21 ins)	15.4 cm	125,000	213,000
ST 10 8	Stanhay	10 cm (4 ins)	9.9 cm	1,000,000	1,006,000
ST 10 6	Stanhay	10 cm (4 ins)	14.7 cm	750,000	717,000
ST 10 4	Stanhay	10 cm (4 ins)	19.8 cm	500,000	608,000
ST 10 2	Stanhay	10 cm (4 ins)	39.9 cm	250,000	346,000
ST 20 2	Stanhay	20 cm (8 ins)	19.8 cm	250,000	277,000
ST 20 1	Stanhay	20 cm (8 ins)	39.9 cm	125,000	156,000

NOTES: (1) On all plots of treatment DRILLS NG 53 4 the drill malfunctioned and yields are not presented.
(2) On one plot of treatment DRILLS MF 18 2 the drill malfunctioned. An estimated value was used in the analysis.
(3) Populations achieved with treatment DRILLS NG 53 1 were nearly double those intended.

Basal applications: Manures: Chalk at 7.5 t. FYM at 20 t. Weedkiller: Simazine at 0.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden.

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77/R/BE/6

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. FYM applied: 16 Sept. Ploughed: 17 Sept. Heavy spring-tine cultivated twice: 7 Mar, 1977. Spike rotary cultivated: 7 Apr. Seed sown: 21 Apr. Weedkiller applied: 9 May. Insecticide applied: 19 July. Combine harvested: 29 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Plant counts were made after establishment and again before harvest. Components of yield were measured before harvest. Nitrogenase activity of the roots was measured at monthly intervals. Incidence of Sitona, viruses and foliar fungi was measured at intervals through the season.

GRAIN TONNES/HECTARE

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

PATHCONT DRILL	STANDARD	ENHANCED	MEAN
MF 18 4	3.02	3.51	3.27
MF 18 2	1.84	3.61	2.72
MF 53 4	3.09	3.51	3.30
MF 53 2	2.42	2.90	2.66
NG 36 4	2.94	4.15	3.55
NG 36 2	2.95	3.40	3.18
NG 53 2	3.03	3.80	3.41
NG 53 1	2.78	3.36	3.07
ST 10 8	4.05	4.62	4.33
ST 10 6	3.83	3.87	3.85
ST 10 4	3.95	4.82	4.39
ST 10 2	3.52	3.67	3.59
ST 20 2	3.04	4.40	3.72
ST 20 1	2.69	3.34	3.02
MEAN	3.08	3.78	3.43

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

TABLE	DRILL	PATHCONT* DRILL
SED	0.305	0.431

* WITHIN THE SAME LEVEL OF PATHCONT ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	25	0.431	12.6

GRAIN MEAN DM% 78.2

SUB PLOT AREA HARVESTED 0.00002

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77/R/BE/8

SPRING BEANS

SOIL INSECTICIDES AND SITONA CONTROL

Object: To study the effects of a range of soil-applied insecticides on the control of Sitona larvae and on yield - Pastures.

Sponsors: R. Bardner, K.E. Fletcher, D.C. Griffiths.

Design: 4 randomised blocks of 16 plots.

Whole plot dimensions: 2.67 x 4.27.

Treatments:

INSCTCDE	Insecticides (kg):	
NONE	None (2 plots per block)	
CARBOP 1	Carbophenothion	2.24
CARBOP 2	Carbophenothion	4.48
CHLORM 2	Chlormephos	4.48
CHLORM 4	Chlormephos	8.96
DIAZIN 1	Diazinon	2.24
DIAZIN 2	Diazinon	4.48
FONOF 2	Fonofos	4.48
FONOF 4	Fonofos	8.96
HCH 1	HCH (BHC)	2.24
HCH 2	HCH (BHC)	4.48
METHIO 1	Methiocarb	2.24
METHIO 2	Methiocarb	4.48
TRIAZO 1	Triazophos	2.24
TRIAZO 2	Triazophos	4.48

NOTE: Treatments applied on 5 Apr, 1977.

Basal applications: Manures: FYM at 20 t. Chalk at 7.5 t. Weedkiller: Simazine at 0.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. FYM applied: 16 Sept. Ploughed: 17 Sept. Heavy spring-tine cultivated: 7 Mar, 1977. Spike rotary cultivated: 5 Apr. Seed sown: 7 Apr. Weedkiller applied: 11 May. Insecticide applied: 19 July. Harvested by hand: 14 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Germination counts were made. Leaves and leaf notches were counted during the season. Sitona larvae were counted twice.

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77/R/BE/8

GRAIN TONNES/HECTARE

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

INSCTCDE	
NONE	3.30
CARBOP 1	3.28
CARBOP 2	3.49
CHLORM 2	3.07
CHLORM 4	3.44
DIAZIN 1	3.36
DIAZIN 2	3.28
FONOF 2	3.64
FONOF 4	3.35
HCH 1	3.51
HCH 2	3.20
METHIO 1	3.24
METHIO 2	3.42
TRIAZO 1	3.36
TRIAZO 2	3.31
MEAN	3.35

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

TABLE	INSCTCDE	
SED	0.227	MIN REP
	0.197	MAX-MIN

	INSCTCDE
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	46	0.321	9.6

GRAIN MEAN DM% 80.4

PLOT AREA HARVESTED 0.00059

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77/R/BE/11

SPRING BEANS

RED TICK LINES

Object: To compare agronomic characters and yields of several lines of red-seeded field beans with two standard white varieties - Long Hoos IV 6.

Sponsor: J. McEwen.

Design: 3 randomised blocks of 14 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY	Varieties:
RT1-RT11	Eleven red-seeded lines selected at Rothamsted
RT C	Bulk seed from red-seeded lines selected at P.B.I. Cambridge
BLAZE	Maris Blaze (white-seeded)
MINDEN	Minden (white-seeded)

NOTE: Seed was sown by hand in rows 61 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Manures: (0:14:28) at 940 kg. Chalk at 2.9 t. Insecticide: Permethrin at 0.15 kg in 340 l on two occasions.

Cultivations, etc.:- PK applied: 18 Nov, 1976. Chalk applied: 3 Dec. Ploughed: 14 Dec-18 Jan, 1977. Power harrowed: 5 Apr. Seed sown: 6 Apr. Insecticide applied: 18 May, 21 June. Harvested by hand: 11 Oct. Previous crops: Wheat 1975, swedes 1976.

NOTE: Plant counts were made after establishment and again before harvest. Flowering dates were recorded. Components of yield were measured before harvest.

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77/R/BE/11

GRAIN TONNES/HECTARE

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

VARIETY	
RT1	4.01
RT2	3.98
RT3	3.94
RT4	4.03
RT5	3.98
RT6	3.87
RT7	4.19
RT8	4.25
RT9	4.08
RT10	3.97
RT11	3.76
RT C	3.61
BLAZE	4.37
MINDEN	3.89
MEAN	3.99

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

TABLE	VARIETY
SED	0.249

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.305	7.6

GRAIN MEAN DM% 75.0

PLOT AREA HARVESTED 0.00015

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77/R/BE/14

SPRING BEANS

COMPARISON OF SPRAYERS

Object: To study the performance of an electrostatic spraying system on distribution of spray material and on yield of beans - Geescroft.

Sponsor: A.J. Arnold.

Design: 3 blocks of 2 plots split into 5.

Whole plot dimensions: 2.67 x 9.14.

Treatments: All combinations of:-

Whole plots:

1. SPRAYDAY	Dates of spraying:
1 JUNE	1 June for electrostatic sprayer, 30 May for farm sprayer
23 JUNE	23 June

Sub plots

2. SPRAYER	Sprayer used to apply permethrin at 0.07 kg:
NONE	None applied
EC 1 E	Electrostatic sprayer, spraying charged particles with a single rotary atomiser, sprayer earthed (SPRAYDAY 1 JUNE only)
EC 2 E	Electrostatic sprayer, spraying charged particles with two rotary atomisers, sprayer earthed
EC 2 -	Electrostatic sprayer, spraying charged particles with two rotary atomisers, sprayer not earthed (SPRAYDAY 23 JUNE only)
EU	Electrostatic sprayer, spraying uncharged particles
FU	Standard Farm sprayer, spraying uncharged particles

NOTES: (1) Farm sprayer applied permethrin in 560 l.
(2) Electrostatic sprayer applied permethrin in 31 l.

Basal applications: Manures: Chalk at 7.5 t. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 2 Sept, 1976. Ploughed: 9 Sept. Heavy spring-tine cultivated four times: 21 Sept, 22 Sept, 3 Nov, 8 Mar, 1977. Seed sown: 9 Mar. Weedkiller applied: 4 Apr. Combine harvested: 30 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Observations were made on patterns of spray deposition.

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77/R/BE/14

GRAIN TONNES/HECTARE

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

SPRAYER / SPRAYDAY	NONE	EC 1 E	EC 2 E	EC 2 -	EU	FU
1 JUNE	4.61	4.95	4.80		4.79	4.93
23 JUNE	4.11		4.62	4.72	4.44	4.44
GRAND MEAN	4.64					

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

TABLE	SPRAYDAY* SPRAYER
SED	0.184

* WITHIN THE SAME LEVEL OF SPRAYDAY ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	16	0.225	4.9

GRAIN MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00244

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77/R/LP/1 and 77/W/LP/1

LUPINS

CONTROL OF PATHOGENS

Object: To study the effects of a range of pesticides on yield and incidence of pathogens of grain lupins - Rothamsted (R) Long Hoos V5, Woburn (W) Far Field I.

Sponsors: J.C. Wilson, A.J. Cockbain.

Design: 3 blocks each of four replicates of 2 x 2.

Whole plot dimensions: 2.29 x 6.10.

Treatments: All combinations of:-

1. ALDICARB Aldicarb to seedbed (kg):

   0
   10

2. FENITROT Fenitrothion foliar spray (kg):

   0.00
   0.75

NOTES: (1) Fenitrothion was applied in 340 l on 1 June to Long Hoos V5 (R), and on 2 June to Far Field I (W).
(2) Additional treatments to test pirimicarb and benomyl foliar sprays were planned but not applied because target pathogens were not present.

Basal applications: Manures: (0:14:28) at 500 kg to Long Hoos V5 (R). (0:14:28) at 340 kg to Far Field I (W). Weedkiller: Trifluralin at 1.1 kg in 340 l.

Seed: Kievsky, sown at 220 kg Long Hoos V5 (R), and at 250 kg Far Field I (W). Seed inoculated with Rhizobium lupini.

Cultivations, etc.:-
Long Hoos V5 (R): Ploughed: 3 Mar, 1977. PK applied: 10 Mar. Power harrowed: 5 Apr. Weedkiller applied, power harrowed: 6 Apr. Treatment aldicarb applied, power harrowed: 7 Apr. Seed sown: 8 Apr. Combine harvested: 28 Oct. Previous crops: Fallow 1975, potatoes 1976.
Far Field I (W): Heavy spring-tine cultivated: 19 Aug, 1976. Ploughed twice: 6 Sept, 15 Feb, 1977. Spring-tine cultivated: 30 Mar. Weedkiller applied, spring-tine cultivated: 31 Mar. Treatment aldicarb applied, PK applied, power harrowed and seed sown: 4 Apr. Combine harvested: 26 Oct. Previous crops: Potatoes 1975, wheat 1976.

NOTE: Diseases and pests were assessed during the season.

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77/R/LP/1 LONG HOOS V 5(R)

GRAIN TONNES/HECTARE

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

FENITROT ALDICARB	0.00	0.75	MEAN
0	2.25	2.21	2.23
10	2.22	2.23	2.23
MEAN	2.23	2.22	2.23

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

TABLE	ALDICARB	FENITROT	ALDICARB FENITROT
SED	0.044	0.044	0.062

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

STRATUM	DF	SE	CV%
BLOCK.WP	42	0.151	6.8

GRAIN MEAN DM% 60.6

PLOT AREA HARVESTED 0.00139

77/W/LP/1 FAR FIELD (W)

GRAIN TONNES/HECTARE

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

FENITROT ALDICARB	0.00	0.75	MEAN
0	2.18	2.28	2.23
10	2.26	2.21	2.23
MEAN	2.22	2.24	2.23

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

TABLE	ALDICARB	FENITROT	ALDICARB FENITROT
SED	0.049	0.049	0.069

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

STRATUM	DF	SE	CV%
BLOCK.WP	42	0.169	7.6

GRAIN MEAN DM% 66.6

PLOT AREA HARVESTED 0.00139

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77/R/LP/2

LUPINS

SEED RATES, ROW SPACING AND PATHOGEN CONTROL

Object: To study the effects of seed rates, row spacing and pathogen control on yields and incidence of pests and diseases - Long Hoos VI/VII 1.

Sponsors: J.C. Wilson, G.A. Salt, A.J. Cockbain.

Design: 2 randomised blocks of 3 x 3 x 2.

Whole plot dimensions: 3.05 x 7.62.

Treatments: All combinations of:-

1. SEEDRATE	Seed Rates (kg):	
	120	
	240	
	360	
2. ROW SPAC	Spacing between rows:	
	13 CM	13 cm (5 inches)
	25 CM	25 cm (10 inches)
	38 CM	38 cm (15 inches)
3. PATHCONT	Pathogen control:	
	NONE	None
	FULL	Aldicarb at 10 kg + benomyl at 32 kg to seedbed + foliar spray of fenitrothion at 0.7 kg in 340 l applied on 1 June.

Basal applications: Manures: (0:14:28) at 880 kg. Weedkiller: Trifluralin at 0.9 kg in 340 l.

Seed: Kievsky.

Cultivations, etc.:- PK applied: 9 Nov, 1976. Ploughed: 15 Dec, 18 Jan, 1977. Weedkiller applied, power harrowed: 6 Apr. Aldicarb applied to PATHCONT FULL plots, all plots power harrowed: 7 Apr. Benlate applied to PATHCONT FULL plots, all plots power harrowed: 15 Apr. Seed sown: 21 Apr. Combine harvested: 8 Nov. Previous crops: Potatoes 1975, wheat 1976.

NOTE: Incidence of pests and diseases was measured throughout the season.

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77/R/LP/2

GRAIN TONNES/HECTARE

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

ROW SPAC	13 CM	25 CM	38 CM	MEAN
SEEDRATE				
120	1.98	2.07	1.87	1.97
240	2.13	2.23	2.12	2.16
360	2.12	1.99	1.91	2.01
MEAN	2.08	2.10	1.97	2.05

PATHCONT	NONE	FULL	MEAN
SEEDRATE			
120	1.91	2.04	1.97
240	2.13	2.19	2.16
360	1.97	2.05	2.01
MEAN	2.00	2.09	2.05

PATHCONT	NONE	FULL	MEAN
ROW SPAC			
13 CM	2.06	2.09	2.08
25 CM	2.05	2.14	2.10
38 CM	1.90	2.03	1.97
MEAN	2.00	2.09	2.05

ROW SPAC	13 CM		25 CM		38 CM	
PATHCONT	NONE	FULL	NONE	FULL	NONE	FULL
SEEDRATE						
120	1.88	2.08	2.02	2.11	1.82	1.92
240	2.17	2.10	2.19	2.26	2.04	2.20
360	2.13	2.10	1.94	2.04	1.84	1.99

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

TABLE	SEEDRATE	ROW SPAC	PATHCONT	SEEDRATE ROW SPAC
SED	0.062	0.062	0.050	0.107

TABLE	SEEDRATE PATHCONT	ROW SPAC PATHCONT	SEEDRATE ROW SPAC PATHCONT
SED	0.087	0.087	0.151

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.151	7.4

GRAIN MEAN DM% 64.1

PLOT AREA HARVESTED 0.00002

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77/R/PE/1 and 77/W/PE/1

PEAS

CONTROL OF PATHOGENS

Object: To study the effects of a range of pesticides on the incidence of pathogens and on the yield of leafless peas - Rothamsted (R), Long Hoos V 1 and Woburn (W) Far Field I.

Sponsors: A.J. Cockbain, K.E. Fletcher, J. McEwen, G.A. Salt, C. Wall, A.G. Whitehead.

Design: 3 blocks of 2 x 2 x 2. Randomisation restricted.

Whole plot dimensions: 4.19 x 5.49.

Treatments: All combinations of:-

1.	NEMACIDE	Nematicide:
	NONE	None
	ALDICARB	Aldicarb at 10 kg to the seedbed
2.	INSCTCDE	Insecticide:
	NONE	None
	TRIAZOPH	Triazophos at 0.34 l in 680 l
3.	FUNGCIDE	Fungicide:
	NONE	None
	BEN+ZIN	Benomyl at 0.56 + zineb at 1.6 kg in 340 l

Basal applications: Manures: Chalk at 2.9 t to Long Hoos V 1 (R) only. (0:14:28) at 880 kg to Long Hoos V 1 (R). (0:14:28) at 340 kg to Far Field I (W). Weedkillers: Trietazine plus simazine ('Remtal' at 2.2 kg Long Hoos V 1 (R), at 1.7 kg Far Field I (W)), both in 330 l.

Seed: BS4, dressed thiram, sown at 220 kg Long Hoos V 1 (R), sown at 270 kg Far Field I (W).

Cultivations, etc.:- Long Hoos V 1 (R): Chalk applied: 8 Sept, 1976. Deep-tine cultivated: 13 Sept. PK applied: 8 Nov. Ploughed: 8 Nov-14 Dec. Power harrowed: 6 Apr, 1977. Treatment nematicide applied and all plots power harrowed: 7 Apr. Seed sown: 8 Apr. Weedkillers applied: 15 Apr. Treatment insecticide applied: 7 July. Treatment insecticide repeated and fungicides applied: 22 July. Harvested by hand: 6 Sept. Previous crops: Potatoes 1975, spring wheat 1976.
Far Field I (W): Heavy spring-tine cultivated: 19 Aug, 1976. Ploughed twice: 6 Sept, 15 Feb, 1977. Spring-tine cultivated: 30 Mar. Treatment nematicide applied, PK applied, all plots power harrowed and seed sown: 4 Apr. Weedkillers applied: 13 Apr. Treatment insecticide applied: 6 July. Treatment insecticide repeated and fungicides applied: 22 July. Harvested by hand: 5 Sept. Previous crops: Potatoes 1975, wheat 1976.

NOTE: Pea moth was monitored throughout the season at both sites and pea moth damage was assessed. Observations were made on diseases and pests throughout the season.

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77/R/PE/1 LONG HOOS V I(R)

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	TRIAZOPH	MEAN
NEMACIDE			
NONE	3.27	3.48	3.38
ALDICARB	3.56	3.59	3.57
MEAN	3.41	3.54	3.47

FUNGCIDE	NONE	BEN+ZIN	MEAN
NEMACIDE			
NONE	3.35	3.41	3.38
ALDICARB	3.53	3.62	3.57
MEAN	3.44	3.51	3.47

FUNGCIDE	NONE	BEN+ZIN	MEAN
INSCTCDE			
NONE	3.41	3.42	3.41
TRIAZOPH	3.47	3.60	3.54
MEAN	3.44	3.51	3.47

INSCTCDE	NONE		TRIAZOPH	
FUNGCIDE	NONE	BEN+ZIN	NONE	BEN+ZIN
NEMACIDE				
NONE	3.31	3.23	3.39	3.58
ALDICARB	3.51	3.60	3.55	3.63

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

TABLE	NEMACIDE	INSCTCDE	FUNGCIDE	NEMACIDE INSCTCDE
SED	0.113	0.113	0.113	0.160

TABLE	NEMACIDE FUNGCIDE	INSCTCDE FUNGCIDE	NEMACIDE INSCTCDE FUNGCIDE
SED	0.160	0.160	0.226

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.277	8.0

GRAIN MEAN DM% 76.0

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77/R/PE/1 LONG HOOS V I(R)

STRAW TONNES/HECTARE

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

INSCTCDE	NONE	TRIAZOPH	MEAN
NEMACIDE			
NONE	4.69	5.06	4.87
ALDICARB	5.28	5.00	5.14
MEAN	4.99	5.03	5.01

FUNGCIDE	NONE	BEN+ZIN	MEAN
NEMACIDE			
NONE	4.70	5.05	4.87
ALDICARB	5.18	5.10	5.14
MEAN	4.94	5.07	5.01

FUNGCIDE	NONE	BEN+ZIN	MEAN
INSCTCDE			
NONE	4.82	5.15	4.99
TRIAZOPH	5.05	5.00	5.03
MEAN	4.94	5.07	5.01

INSCTCDE	NONE		TRIAZOPH	
FUNGCIDE	NONE	BEN+ZIN	NONE	BEN+ZIN
NEMACIDE				
NONE	4.24	5.15	5.16	4.96
ALDICARB	5.41	5.15	4.95	5.04

STRAW MEAN DM% 71.4

PLOT AREA HARVESTED 0.00091

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77/W/PE/1 FARFIELD I(W)

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	TRIAZOPH	MEAN
NEMACIDE			
NONE	2.81	3.08	2.95
ALDICARB	3.74	3.86	3.80
MEAN	3.28	3.47	3.37

FUNGCIDE	NONE	BEN+ZIN	MEAN
NEMACIDE			
NONE	2.95	2.94	2.95
ALDICARB	3.59	4.01	3.80
MEAN	3.27	3.48	3.37

FUNGCIDE	NONE	BEN+ZIN	MEAN
INSCTCDE			
NONE	3.22	3.33	3.28
TRIAZOPH	3.32	3.62	3.47
MEAN	3.27	3.48	3.37

INSCTCDE	NONE		TRIAZOPH	
FUNGCIDE	NONE	BEN+ZIN	NONE	BEN+ZIN
NEMACIDE				
NONE	2.85	2.76	3.04	3.12
ALDICARB	3.58	3.91	3.60	4.12

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

TABLE	NEMACIDE	INSCTCDE	FUNGCIDE	NEMACIDE INSCTCDE
SED	0.127	0.127	0.127	0.180

TABLE	NEMACIDE FUNGCIDE	INSCTCDE FUNGCIDE	NEMACIDE INSCTCDE FUNGCIDE
SED	0.180	0.180	0.254

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.312	9.2

GRAIN MEAN DM% 80.4

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77/W/PE/1 FARFIELD I(W)

STRAW TONNES/HECTARE

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

INSCTCDE	NONE	TRIAZOPH	MEAN
NEMACIDE			
NONE	2.48	2.68	2.58
ALDICARB	3.01	2.90	2.96
MEAN	2.74	2.79	2.77

FUNGCIDE	NONE	BEN+ZIN	MEAN
NEMACIDE			
NONE	2.64	2.52	2.58
ALDICARB	2.86	3.05	2.96
MEAN	2.75	2.78	2.77

FUNGCIDE	NONE	BEN+ZIN	MEAN
INSCTCDE			
NONE	2.70	2.78	2.74
TRIAZOPH	2.80	2.78	2.79
MEAN	2.75	2.78	2.77

INSCTCDE	NONE		TRIAZOPH	
FUNGCIDE	NONE	BEN+ZIN	NONE	BEN+ZIN
NEMACIDE				
NONE	2.48	2.48	2.80	2.56
ALDICARB	2.93	3.09	2.80	3.00

STRAW MEAN DM% 85.5

PLOT AREA HARVESTED 0.00091

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77/R/PE/3

PEAS

EFFECTS OF N

Object: To study the effects of small dressings of nitrogen fertiliser on the yield of leafless peas - Fosters O & EI.

Sponsor: J. McEwen.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.19 x 6.10.

Treatments:

N	Nitrogen fertiliser (kg N):
0	0 (2 plots per block)
25 S	25 to seedbed (25 Apr, 1977)
50 S	50 to seedbed (25 Apr)
25 F	25 at flowering (1 July)
50 F	50 at flowering (1 July)

Basal applications: Manures: (0:14:28) at 500 kg. Weedkillers: Trietazine with simazine ('Remtal' at 2.2 lb in 340 l).

Seed: BS4, dressed thiram, sown at 224 kg.

Cultivations, etc.:- Ploughed: 12 Nov, 1976. PK applied: 10 Mar, 1977. Power harrowed and seed sown: 12 Apr. Weedkillers applied: 15 Apr. Harvested by hand: 29 Aug. Previous crops: Barley 1975, 1976.

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77/R/PE/3

GRAIN TONNES/HECTARE

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

N	0	25 S	50 S	25 F	50 F	MEAN
	3.31	3.32	3.66	3.32	3.40	3.39

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

TABLE	N	
SED	0.232	MIN REP
	0.201	MAX-MIN

	N
MAX-MIN	O V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.284	8.4

GRAIN MEAN DM% 75.9

STRAW TONNES/HECTARE

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

N	0	25 S	50 S	25 F	50 F	MEAN
	2.94	3.65	3.23	3.04	2.92	3.12

STRAW MEAN DM% 87.3

PLOT AREA HARVESTED 0.00101

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77/R/G/1 and 77/W/G/1

GRASS

AQUEOUS AMMONIA AND NITRIFICATION INHIBITORS

Object: To study the effects of adding a range of nitrification inhibitors to liquid fertilisers on the yield and nitrogen uptake of grass cut for silage - Rothamsted (R) Bones Close and Woburn (W) Stackyard II.

Sponsors: J. Ashworth, G.G. Briggs, A. Penny.

Design: Bones Close (R): 2 randomised blocks of 25 plots.
Stackyard II (W): 2 randomised blocks of 24 plots.

Whole plot dimensions: 2.44 x 9.14.

Treatments: All combinations of:-

1. NI FORM — Nitrification inhibitors added to aqueous ammonia applied at 375 kg N, as a single application, injection tines spaced 30 cm apart:

NITRAPYR	Nitrapyrin ('N-Serve')
SOD TRI	Sodium trithiocarbonate

2. NI RATE — Rates of nitrification inhibitors (kg)

	Nitrapyrin	Sodium trithiocarbonate
1	1	10
2	2	20
3	3	30

3. NI TIME — Times of applying aqueous ammonia and nitrification inhibitors:

AUTUMN
SPRING

plus thirteen extra treatments (R) or twelve extra treatments (W)
EXTRA

Aqueous ammonia applied at 375 kg N, as a single application, tines spaced 30 cm apart except where stated:

AQ/A	Alone, in autumn
AQ/S	Alone, in spring
AQ/A+	Alone, in autumn, tines spaced 60 cm apart
AQ/S+	Alone, in spring, tines spaced 60 cm apart
AQ+SH/A	With sodium hydroxide, nitrification modifier, in autumn ((R) only)
AQ+TM/A	With trimethylamine, nitrification modifier in autumn ((R) only)

Aqueous urea/ammonium nitrate, applied at 375 kg N, as a single application, tines spaced 30 cm apart:

UA/S	Alone in spring
UA+ST3/S	With sodium trithiocarbonate, 30 kg, in spring

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77/R/G/1 and 77/W/G/1

Nitrification inhibitor alone, tines spaced 30 cm apart:

-ST3/S — Sodium trithiocarbonate, 30 kg in spring

'Nitro-Chalk', dressing divided between cuts (kg N, total):

0	0
NC 250	250
NC 375	375 (duplicated at (W) only)
NC 500	500

Basal applications:
Bones Close (R): Manures: (0:14:28) at 1000 kg.
Stackyard II (W): Manures: (0:14:28) at 1000 kg. Chalk at 2.8 t.

Cultivations, etc.:-
Bones Close (R): NI TIME AUTUMN applied: 25 Nov, 1976. PK applied: 9 Dec. NI TIME SPRING applied: 7 Mar, 1977. 'Nitro-Chalk' applied: 10 Mar, 27 May, 28 July. Cut three times: 24 May, 18 July, 7 Nov. Previous crops: Grass since 1952.
Stackyard II (W): Chalk applied: 3 Sept, 1976. NI TIME AUTUMN applied: 22 Nov. PK applied: 18 Jan, 1977. NI TIME SPRING applied: 8 Mar. 'Nitro-Chalk' applied: 11 Mar, 9 June, 26 July. Cut three times: 30 May, 20 July, 27 Sept. Previous crops: Ley 1975 and 1976.

NOTES: (1) Grass samples were taken for N determinations.
(2) N in the injected soil profile was measured during the season and ammonia evaporation measured.

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77/R/G/1 BONES CLOSE (R)

1ST CUT (24/5/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	5.92	5.90	5.68	5.84
SOD TRI	5.87	5.56	5.96	5.80
MEAN	5.90	5.73	5.82	5.82

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	6.08	5.59	5.84
SOD TRI	5.90	5.69	5.80
MEAN	5.99	5.64	5.82

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	6.18	5.62	5.90
2	5.67	5.80	5.73
3	6.13	5.51	5.82
MEAN	5.99	5.64	5.82

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	6.12	5.73	5.97	5.83	6.15	5.22
SOD TRI	6.23	5.50	5.36	5.77	6.12	5.80

EXTRA	
AQ/A	6.37
AQ/S	5.53
AQ/A+	5.70
AQ/S+	5.11
AQ+SH/A	6.15
AQ+TM/A	5.74
UA/S	5.14
UA+ST3/S	6.18
-ST3/S	3.12
0	3.20
NC 250	5.47
NC 375	5.99
NC 500	5.92
MEAN	5.35

GRAND MEAN 5.58

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.247	0.101	0.124	0.101

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.175	0.143	0.175	0.247

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77/R/G/1 BONES CLOSE (R)

2ND CUT (18/7/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	4.48	4.25	4.29	4.34
SOD TRI	4.28	4.17	4.22	4.22
MEAN	4.38	4.21	4.25	4.28

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	4.22	4.46	4.34
SOD TRI	3.99	4.46	4.22
MEAN	4.11	4.46	4.28

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	4.23	4.53	4.38
2	3.97	4.45	4.21
3	4.11	4.40	4.25
MEAN	4.11	4.46	4.28

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	4.27	4.70	4.06	4.45	4.34	4.24
SOD TRI	4.20	4.36	3.89	4.45	3.88	4.56

EXTRA	
AQ/A	4.01
AQ/S	4.23
AQ/A+	4.19
AQ/S+	4.34
AQ+SH/A	3.99
AQ+TM/A	4.32
UA/S	4.36
UA+ST3/S	4.58
-ST3/S	2.33
0	2.15
NC 250	4.59
NC 375	4.52
NC 500	4.35
MEAN	4.00

GRAND MEAN 4.13

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.318	0.130	0.159	0.130

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.225	0.184	0.225	0.318

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77/R/G/1 BONES CLOSE (R)

3RD CUT (7/11/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	1.47	1.42	1.48	1.45
SOD TRI	1.40	1.37	1.46	1.41
MEAN	1.43	1.39	1.47	1.43

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	1.40	1.51	1.45
SOD TRI	1.45	1.37	1.41
MEAN	1.43	1.44	1.43

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	1.39	1.48	1.43
2	1.36	1.43	1.39
3	1.53	1.41	1.47
MEAN	1.43	1.44	1.43

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	1.34	1.59	1.30	1.53	1.57	1.40
SOD TRI	1.44	1.36	1.42	1.32	1.49	1.43

EXTRA	
AQ/A	1.80
AQ/S	1.32
AQ/A+	1.42
AQ/S+	1.31
AQ+SH/A	1.56
AQ+TM/A	1.48
UA/S	1.43
UA+ST3/S	1.29
-ST3/S	0.57
0	0.59
NC 250	2.04
NC 375	1.84
NC 500	1.67
MEAN	1.41

GRAND MEAN 1.42

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.222	0.090	0.111	0.090

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.157	0.128	0.157	0.222

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77/R/G/1 BONES CLOSE (R)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	11.87	11.57	11.45	11.63
SOD TRI	11.54	11.10	11.64	11.43
MEAN	11.71	11.34	11.55	11.53

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	11.70	11.56	11.63
SOD TRI	11.34	11.52	11.43
MEAN	11.52	11.54	11.53

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	11.80	11.62	11.71
2	11.00	11.67	11.34
3	11.77	11.32	11.55
MEAN	11.52	11.54	11.53

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	11.73	12.02	11.33	11.81	12.05	10.85
SOD TRI	11.87	11.22	10.67	11.54	11.49	11.79

EXTRA	
AQ/A	12.19
AQ/S	11.07
AQ/A+	11.31
AQ/S+	10.75
AQ+SH/A	11.70
AQ+TM/A	11.55
UA/S	10.93
UA+ST3/S	12.04
-ST3/S	6.02
0	5.95
NC 250	12.10
NC 375	12.35
NC 500	11.94
MEAN	10.76

GRAND MEAN 11.13

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.514	0.210	0.257	0.210

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.364	0.297	0.364	0.514

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77/R/G/1 BONES CLOSE (R)

1ST CUT (24/5/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.247	4.4

1ST CUT MEAN DM% 17.1

1ST CUT PLOT AREA HARVESTED 0.00085

2ND CUT (18/7/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.318	7.7

2ND CUT MEAN DM% 23.4

2ND CUT PLOT AREA HARVESTED 0.00104

3RD CUT (7/11/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.222	15.6

3RD CUT MEAN DM% 20.0

3RD CUT PLOT AREA HARVESTED 0.00104

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.514	4.6

TOTAL OF 3 CUTS MEAN DM% 20.2

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77/W/G/1 STACKYARD II (W)

1ST CUT (30/5/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	4.53	5.07	4.50	4.70
SOD TRI	4.27	4.59	4.39	4.42
MEAN	4.40	4.83	4.45	4.56

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	5.88	3.52	4.70
SOD TRI	5.40	3.44	4.42
MEAN	5.64	3.48	4.56

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	5.21	3.59	4.40
2	6.16	3.50	4.83
3	5.55	3.35	4.45
MEAN	5.64	3.48	4.56

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	5.62	3.43	6.46	3.68	5.56	3.45
SOD TRI	4.79	3.74	5.87	3.32	5.53	3.25

EXTRA	
AQ/A	5.84
AQ/S	4.60
AQ/A+	5.14
AQ/S+	2.68
UA/S	5.43
UA+ST3/S	4.82
-ST3/S	0.83
0	0.82
NC 250	3.49
NC 375	5.05
NC 500	4.57
MEAN	4.03

GRAND MEAN 4.29

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.496	0.203	0.248	0.203

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.351	0.286	0.351	0.496

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77/W/G/1 STACKYARD II (W)

2ND CUT (20/7/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	1.22	1.06	0.91	1.06
SOD TRI	1.30	1.15	1.40	1.28
MEAN	1.26	1.10	1.16	1.17

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	1.02	1.10	1.06
SOD TRI	1.23	1.33	1.28
MEAN	1.13	1.22	1.17

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	1.29	1.22	1.26
2	1.09	1.12	1.10
3	1.00	1.31	1.16
MEAN	1.13	1.22	1.17

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	1.19	1.24	1.06	1.05	0.81	1.02
SOD TRI	1.40	1.19	1.12	1.18	1.18	1.61

EXTRA	
AQ/A	1.24
AQ/S	1.13
AQ/A+	1.11
AQ/S+	1.37
UA/S	1.38
UA+ST3/S	1.63
-ST3/S	0.12
0	0.16
NC 250	1.48
NC 375	1.92
NC 500	1.80
MEAN	1.27

GRAND MEAN 1.22

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.221	0.090	0.111	0.090

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.156	0.128	0.156	0.221

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77/W/G/1 STACKYARD II (W)

3RD CUT (27/9/77) DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	1.44	1.35	1.58	1.46
SOD TRI	1.34	1.36	1.35	1.35
MEAN	1.39	1.35	1.46	1.40

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	1.81	1.10	1.46
SOD TRI	1.79	0.90	1.35
MEAN	1.80	1.00	1.40

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	1.94	0.85	1.39
2	1.75	0.95	1.35
3	1.71	1.21	1.46
MEAN	1.80	1.00	1.40

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	1.92	0.97	1.68	1.01	1.82	1.33
SOD TRI	1.95	0.73	1.82	0.89	1.60	1.09

EXTRA	
AQ/A	1.72
AQ/S	1.17
AQ/A+	1.25
AQ/S+	1.44
UA/S	1.43
UA+ST3/S	1.60
-ST3/S	0.04
0	0.07
NC 250	3.12
NC 375	3.55
NC 500	3.65
MEAN	1.88

GRAND MEAN 1.64

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.310	0.126	0.155	0.126

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.219	0.179	0.219	0.310

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77/W/G/1 STACKYARD II (W)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

NI RATE	1	2	3	MEAN
NI FORM				
NITRAPYR	7.19	7.47	7.00	7.22
SOD TRI	6.90	7.10	7.14	7.05
MEAN	7.04	7.29	7.07	7.13

NI TIME	AUTUMN	SPRING	MEAN
NI FORM			
NITRAPYR	8.71	5.73	7.22
SOD TRI	8.42	5.67	7.05
MEAN	8.56	5.70	7.13

NI TIME	AUTUMN	SPRING	MEAN
NI RATE			
1	8.44	5.65	7.04
2	9.00	5.57	7.29
3	8.26	5.88	7.07
MEAN	8.56	5.70	7.13

NI RATE	1		2		3	
NI TIME	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI FORM						
NITRAPYR	8.73	5.64	9.20	5.75	8.19	5.80
SOD TRI	8.15	5.66	8.80	5.39	8.32	5.96

EXTRA	
AQ/A	8.80
AQ/S	6.90
AQ/A+	7.50
AQ/S+	5.49
UA/S	8.25
UA+ST3/S	8.06
-ST3/S	0.99
0	1.05
NC 250	8.08
NC 375	10.52
NC 500	10.02
MEAN	7.18

GRAND MEAN 7.16

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

TABLE	EXTRA	NI FORM	NI RATE	NI TIME
SED	0.640	0.261	0.320	0.261

TABLE	NI FORM NI RATE	NI FORM NI TIME	NI RATE NI TIME	NI FORM NI RATE NI TIME
SED	0.452	0.369	0.452	0.640

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77/W/G/1 STACKYARD II (W)

1ST CUT (30/5/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.496	11.6

1ST CUT MEAN DM% 24.6

1ST CUT PLOT AREA HARVESTED 0.00085

2ND CUT (20/7/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.221	18.1

2ND CUT MEAN DM% 32.0

2ND CUT PLOT AREA HARVESTED 0.00104

3RD CUT (27/9/77) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.310	18.8

3RD CUT MEAN DM% 24.3

3RD CUT PLOT AREA HARVESTED 0.00104

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.640	8.9

TOTAL OF 3 CUTS MEAN DM% 27.0

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77/E/1

METEOROLOGICAL RECORDS 1977 - ROTHAMSTED

(Departure from long-period means in brackets)

MONTH	Total sunshine: hours	Mean temperature: C Air(1)	Dew point	In ground under grass 30cm	100cm
JAN	41 (-10)	2.3 (-0.7)	0.9	3.4	5.4
FEB	67 (-1)	5.0 (+1.7)	3.0	4.9	5.5
MAR	90 (-25)	6.5 (+1.3)	4.3	6.3	6.5
APR	160 (+9)	6.9 (-0.7)	3.5	6.8	6.7
MAY	220 (+27)	10.2 (-0.9)	6.2	10.3	8.7
JUNE	131 (-73)	11.7 (-2.3)	8.5	12.3	10.9
JULY	198 (+6)	15.4 (-0.5)	11.3	15.2	13.2
AUG	133 (-48)	15.0 (-0.7)	12.1	15.2	13.9
SEPT	119 (-25)	13.3 (-0.1)	10.0	14.2	13.7
OCT	106 (+3)	11.5 (+2.0)	9.3	12.3	12.6
NOV	88 (+26)	6.1 (+0.3)	3.7	8.8	10.8
DEC	42 (-3)	5.5 (+1.8)	3.7	6.5	8.0
YEAR*	1395 (-114)	9.1 (+0.1)	6.3	9.6	9.7

MONTH	Ground(2) frosts	Total rainfall:mm 0.000405 ha (1/1000 acre) gauge	Rain(3) days	Drainage through 50.8cm (20 in) soil:mm	Wind(4) km per hour
JAN	24	72 (+8)	19	71	8.5
FEB	16	110 (+61)	24	97	9.7
MAR	18	56 (+8)	17	32	10.9
APR	19	33 (-17)	17	1	11.6
MAY	7	44 (-10)	13	15	11.2
JUNE	3	79 (+24)	18	27	8.7
JULY	0	9 (-55)	8	TRACE	8.0
AUG	0	122 (+58)	16	57	6.2
SEPT	0	25 (-36)	11	6	7.4
OCT	1	54 (-19)	18	18	6.7
NOV	15	63 (-8)	20	40	13.7
DEC	11	63 (-3)	20	55	10.1
YEAR*	114	730 (+11)	201	419	9.4

(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 1977 - WOBURN

(Departure from long-period means in brackets)

MONTH	Total sunshine: hours	Mean temperature:C Air(1)	In ground under grass Dew point	30 cm	100 cm	Ground(2) frosts	Total rainfall:mm 12.7 cm (5in) gauge		Rain(3) days	Wind(4) km per hour
JAN	35 (-15)	2.5 (-0.7)	1.3	3.4	5.7	22	65	(+11)	15	7.1
FEB	60 (-5)	5.1 (+1.7)	3.2	4.9	5.9	15	105	(+66)	21	9.8
MAR	89 (-27)	6.7 (+1.3)	3.6	6.6	6.8	12	52	(+10)	19	10.5
APR	145 (+3)	6.9 (-1.2)	3.8	6.9	7.0	14	33	(-12)	17	10.9
MAY	207 (+25)	9.9 (-1.2)	6.3	10.7	8.8	7	35	(-19)	12	8.3
JUNE	138 (-63)	11.7 (-2.7)	8.9	12.7	10.8	3	80	(+30)	16	8.0
JULY	187 (+6)	15.5 (-0.6)	11.4	16.7	13.1	3	6	(-48)	3	7.8
AUG	126 (-47)	14.9 (-1.0)	12.2	15.8	14.0	0	155	(+95)	20	5.8
SEPT	115 (-20)	13.3 (-0.3)	10.6	14.4	14.0	2	17	(-36)	11	8.2
OCT	107 (+6)	11.5 (+1.5)	9.6	12.1	12.7	5	28	(-26)	10	7.8
NOV	83 (+23)	6.3 (-0.1)	3.8	8.3	11.0	13	57	(-7)	18	12.4
DEC	40 (-5)	5.7 (+1.7)	3.8	6.2	8.3	14	59	(+7)	17	9.3
YEAR*	1332 (-119)	9.1 (-0.1)	6.5	9.9	9.8	110	692	(+71)	179	8.8

METEOROLOGICAL RECORDS 1977 - SAXMUNDHAM

MONTH	Mean temperature: C Air(1)	In ground under bare soil Dew point	30 cm	Ground(2) frosts	Total rainfall :mm 12.7 cm (5 in) gauge	Rain(3) days	Wind(4) km per hour
JAN	3.3	2.2	3.5	15	65	19	11.3
FEB	5.6	3.9	4.7	12	71	15	12.4
MAR	7.2	5.0	6.3	11	53	15	13.8
APR	7.0	2.8	6.9	13+	28	9+	14.0
MAY	10.0	6.7	11.1	3	42	10+	12.9
JUNE	12.4	9.4	13.8	1	36	12	9.3
JULY	15.6	12.8	17.5	0	10	6	8.3
AUG	15.2	13.9	16.4	0	72	14	7.9
SEPT	13.8	11.1	14.5	0	17	9	10.2
OCT	12.0	10.5	11.7	1	18	10	9.8
NOV	6.9	5.0	7.5	6	69	18	15.8
DEC	6.7	4.4	6.1	4	65	10	14.0
YEAR*	9.6	7.3	10.0	66	546	147	11.6

(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

Amendment to 'YIELDS' 1976 76/E/1 page 357
Saxmundham rainfall. Inches of rainfall were presented not mm and the mean was presented instead of the total
The figures should be:
Total rainfall: mm 12.7cm (5in) gauge

JAN	FEB	MAR	APRI	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
35	22	15	11	21	9	64	52	128	109	70	46	582

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)	1
1 foot (ft) (= 12 in.)	= 30·48 cm	1
1 yard (yd) (= 3 ft)	= 0·9144 metre (m)	1
1 square yard (sq yd)	= 0·8361 sq m	1
1 acre (= 4840 sq yd)	= 0·4047 hectare (ha)	1
1 ounce (oz)	= 28·35 grams (g)	1
1 pound (lb)	= 0·4536 kilogram (kg)	1
1 hundredweight (cwt) (= 112 lb)	= 50·80 kg	1
1 ton (= 2240 lb)	= 1016 kg = 1·016 metric tons (tonnes)	1
1 pint	= 0·5682 litre	1
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

CWT/ACRE TO TONNES/HA

TONNES/HA 0·0 0·03 0·05 0·08 0·10 0·13 0·15 0·18 0·20 0·23 0·25 0·28 0·30 0·33

CWT/ACRE 0·0 0·2 0·4 0·6 0·8 1·0 1·2 1·4 1·6 1·8 2·0 2·2 2·4 2·6

CWT/ACRE TO TONNES/HA

TONNES/HA 0·0 0·63 1·26 1·88 2·51 3·14 3·77 4·39 5·02 5·65 6·28 6·90 7·53 8·16

CWT/ACRE 0 5 10 15 20 25 30 35 40 45 50 55 60 65

TONS/ACRE TO TONNES/HA

TONNES/HA 0·0 2·5 5·0 7·5 10·0 12·5 15·1 17·6 20·1 22·6 25·1 50·2 37·7 62·8

TONS/ACRE 0 1 2 3 4 5 6 7 8 9 10 20 15 25