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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1979



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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

YIELDS

of the

FIELD

EXPERIMENTS

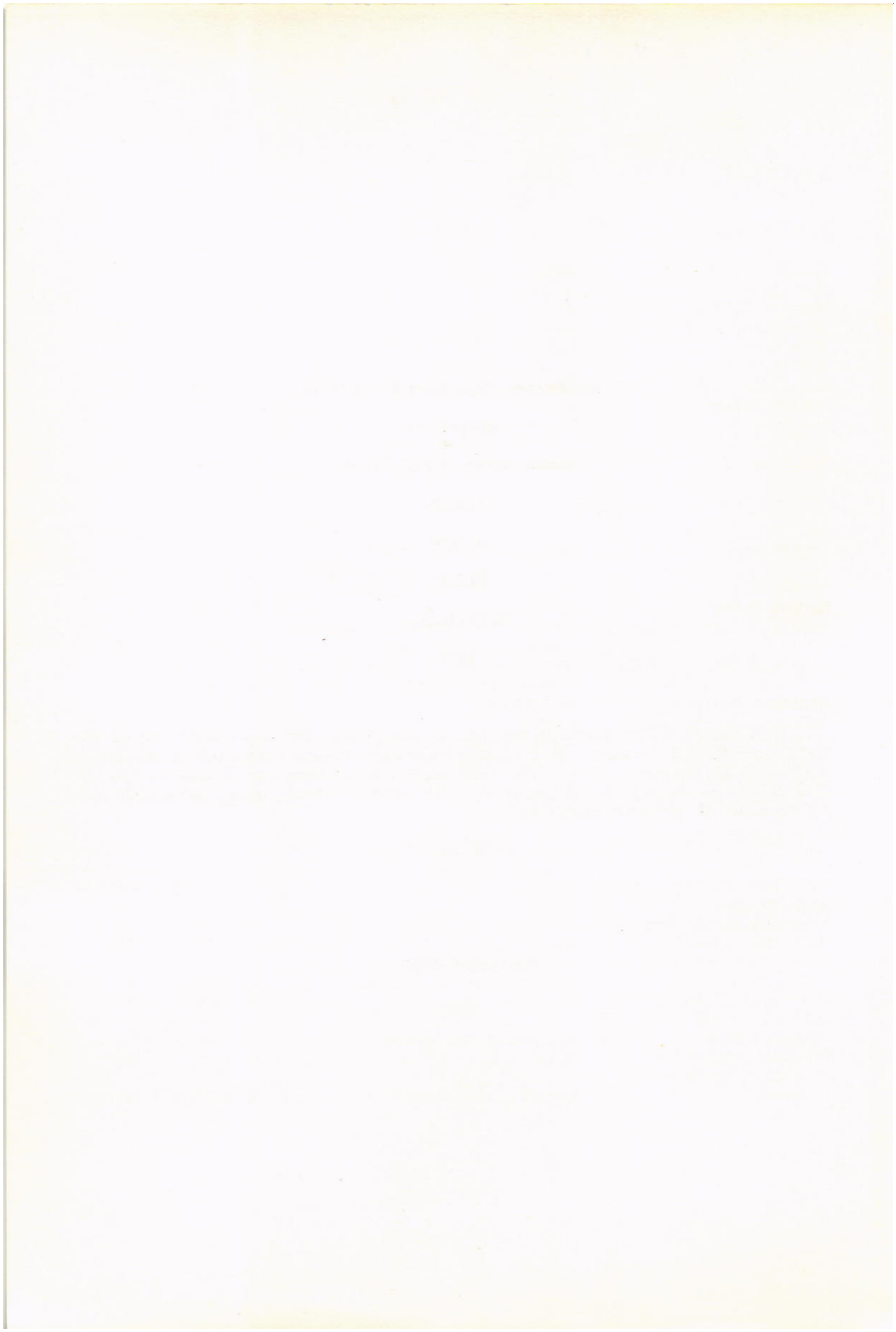
1979

This report is produced by members of the Statistics Department and of the Field Experiments Section. It 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.

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CONVENTIONS 1979

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 26% N unless otherwise stated.

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/or gamma HCH 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 at Rothamsted showed that on average the yield of 16 rows (50 ft (15 m) long) was 7.8% greater with blank rows than without. (Experimental Husbandry 23 pp 16-20 (1972)).

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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79/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous winter wheat. From 1968 two three-year rotations were included: potatoes, beans, wheat and fallow, wheat, wheat. In 1979 the first rotation was changed to fallow, potatoes, wheat.

The 136th year, wheat, fallow, potatoes. The 12th year of the rotations.

For previous years see 'Details' 1967 & 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-78/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	5, 6 & 7	0.00659
	8 & 9	0.00694
Potatoes:	4	0.00659

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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79/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 kieserite 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	78	79
SC0/W28	Section 0	W (F 1951)	W	W	W	W	W	W	W	W	W	W	W
SC1/W13	Section 1	W (F 1966)	W	W	W	W	W	W	W	W	W	W	W
-	Section 2	BE	W	P	BE	W	P	BE	W	P	BE	W	F
-	Section 3	W (F 1967)	W	F	W	W	F	W	W	F	W	W	F
POTATOES	Section 4	W (F 1965)	P	BE	W	P	BE	W	P	BE	W	P	P
SC5/W1F	Section 5	W (F 1965)	F	W	W	F	W	W	F	W	W	F	W
SC6/W2F	Section 6	F	W	W	F	W	W	F	W	W	F	W	W
SC7/W1BE	Section 7	P	BE	W	P	BE	W	P	BE	W	P	BE	W
SC8/W7	Section 8*	W (F 1963)	W	W	W	F	W	W	W	W	W	W	W
SC9/W21	Section 9	W (F 1958)	W	W	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: Section 1 only: Chalk at 2.9 t. Weedkillers: Glyphosate at 1.5 kg in 220 l (applied to sections 0, 1, 6 and 9 only). Chlortoluron at 3.6 kg in 220 l to all wheat sections except 8. Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.2 kg in 220 l) to all wheat sections except 8. Fungicide: Triadimefon at 0.13 kg in 220 l.
Potatoes: Paraquat at 0.42 kg ion with linuron at 1.1 kg in 220 l. Fungicide: Mancozeb at 1.4 kg in 220 l applied on five occasions, with insecticide on the first three. Insecticide: Pirimicarb at 0.14 kg.
Fallow: Sections 2 & 3: Chalk at 2.9 t. Weedkillers: Glyphosate at 1.5 kg in 220 l.

NOTE: Since autumn 1975 chalk is applied at 2.9 t each autumn to sets of Sections on a three-year cycle. Year 1: Sections 1, 2, 3. Year 2: Sections 6, 7, 8 & 9. Year 3: Sections 0, 4, 5. Chalk is applied to all plots of each section.

Seed: Wheat: Flanders, sown at 200 kg.
Potatoes: Pentland Crown.

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79/R/BK/1

Cultivations, etc.:-

ALL SECTIONS: Sulphate of potash, sulphate of soda, kieserite and castor meal applied: 2 Oct, 1978. Superphosphate applied: 3 Oct. FYM applied: 4 Oct. Ploughed: 5 Oct.

CROPPED SECTIONS: Wheat: Glyphosate applied: 22 Sept, 1978. Chalk applied: 3 Oct. Disc harrowed and rotary harrowed: 9 Oct. Seed sown: 10 Oct. Chlortoluron applied: 12 Oct. N applied: 3 May, 1979. 'Banlene Plus' applied: 9 May. Triadimefon applied: 27 June. Combine harvested: 28 Aug.

Potatoes: Spring-tine cultivated: 1 May. N applied, spike rotary cultivated, potatoes planted: 14 May. Grubbed twice: 18 May and 3 July. Weedkillers applied: 30 May. Insecticide and fungicide applied: 26 June, 5 July, 20 July. Fungicide applied: 3 Aug and 15 Aug. Haulm pulverized: 4 Sept. Lifted: 14 Sept.

FALLOW SECTION: Chalk applied: 3 Oct. Spring-tine cultivated: 1 May. Ploughed twice: 23 May, 10 July. Heavy spring-tine cultivated twice: 14 June and 31 July.

POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	25.6	92.8
21DN2	29.7	95.6
22D	24.0	95.2
030	6.1	84.7
05MIN	9.8	89.7
06N1MIN	18.7	86.5
07N2MIN	25.7	92.7
08N3MIN	30.0	91.4
09N4MIN	31.1	94.7
10N2	7.7	90.8
11N2P	7.9	80.3
12N2PNA	8.8	78.2
13N2PK	15.9	84.3
14N2PKMG	22.9	92.4
15N3MIN	30.0	93.8
16N2MIN	23.4	92.1
17N2MINH	20.6	93.7
18N2MINH	20.9	91.9
19C	13.5	93.5

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79/R/BK/1 WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	SC7/W1BE	SC5/W1F	SC6/W2F	SC1/W13	SC9/W21	SC0/W28	SC8/W7	MEAN
01DN2PK	8.70	7.96	8.34	*	*	*	*	8.34
21DN2	8.27	8.31	8.34	7.31	7.92	6.64	4.06	7.26
22D	6.91	7.68	5.55	5.76	5.72	5.31	3.02	5.71
030	2.65	2.43	0.83	1.15	1.04	1.05	1.26	1.49
05MIN	3.58	2.33	0.83	1.03	1.35	1.54	1.99	1.81
06N1MIN	5.83	5.15	3.85	3.67	3.96	3.91	2.18	4.08
07N2MIN	7.08	7.22	6.35	5.83	6.04	5.94	3.13	5.94
08N3MIN	7.33	7.63	7.36	6.33	6.60	6.28	4.05	6.51
09N4MIN	7.60	7.41	7.77	7.02	7.31	6.63	5.07	6.97
10N2	4.63	4.61	4.18	2.28	2.04	2.80	2.09	3.23
11N2P	5.82	5.30	5.44	3.94	2.98	4.64	2.59	4.39
12N2PNA	6.28	5.87	6.04	5.14	4.61	5.49	2.55	5.14
13N2PK	6.70	6.30	6.12	6.13	6.04	5.77	3.89	5.85
14N2PKMG	6.99	6.70	6.43	6.67	6.27	6.25	3.60	6.13
15N3MIN	6.96	7.46	6.99	6.92	6.69	6.54	4.61	6.60
16N2MIN	6.74	6.74	6.04	5.84	6.34	5.72	4.07	5.93
17N2MINH	7.00	6.74	6.10	5.13	6.37	5.28	4.86	5.93
18N2MINH	7.21	6.94	6.37	5.34	6.54	5.58	4.52	6.07
19C	4.47	4.94	3.13	2.88	3.25	2.71	2.24	3.37
20NKMG	*	*	*	1.58	*	2.35	*	1.96

GRAIN MEAN DM% 83.4

STRAW TONNES/HECTARE

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

SECTION PLOT	SC7/W1BE	SC5/W1F	SC61/W2F	SC1/W13	SC9/W21	SC0/W28	SC8/W7	MEAN
01DN2PK	6.03	5.62	5.66	*	*	*	*	5.77
21DN2	6.55	6.18	5.73	5.20	5.71	4.17	5.17	5.53
22D	3.74	5.10	3.35	3.86	3.64	3.69	3.27	3.81
030	1.13	1.22	0.33	0.60	0.47	0.61	0.92	0.75
05MIN	1.78	1.31	0.33	0.53	0.62	0.49	1.94	1.00
06N1MIN	2.01	3.11	2.22	1.74	2.17	2.23	4.38	2.55
07N2MIN	4.60	4.58	3.80	3.40	3.91	3.70	3.97	4.00
08N3MIN	4.55	4.35	4.51	3.32	4.60	3.67	4.31	4.19
09N4MIN	5.10	4.36	5.24	4.45	4.42	4.74	4.28	4.66
10N2	2.02	2.04	2.07	1.19	1.02	1.48	2.40	1.75
11N2P	2.63	2.63	2.65	1.61	1.10	2.30	2.59	2.22
12N2PNA	2.93	3.13	3.21	2.05	2.26	3.43	3.05	2.87
13N2PK	4.26	4.56	3.90	3.97	4.35	4.38	4.62	4.29
14N2PKMG	3.93	4.30	4.13	3.76	4.19	3.92	4.18	4.06
15N3MIN	4.08	4.83	5.03	3.74	4.72	4.13	4.69	4.46
16N2MIN	4.30	4.30	3.86	3.62	4.09	3.42	4.09	3.95
17N2MINH	4.35	3.85	3.85	3.12	4.26	3.66	4.22	3.90
18N2MINH	4.86	4.68	3.98	3.24	4.07	3.66	4.22	4.10
19C	2.34	2.67	1.54	1.19	1.70	1.58	2.26	1.90
20NKMG	*	*	*	0.86	*	1.24	*	1.05

STRAW MEAN DM% 91.0

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79/R/HB/2

HOOSFIELD

Object: To study the effects of organic and inorganic manures on continuous spring barley. From 1968 to 1978 a rotation of potatoes, beans and barley was practised. In 1979 the rotation was discontinued and the experiment reverted to continuous barley.

The 128th year, barley.

For previous years see 'Details' 1967 & 1973, Station Report for 1966 and 74-78/R/HB/2.

Treatments: All combinations of:-

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

	Form of N 1852-1966	Additional treatments 1852-1979	Frequency of barley cropping since last non-cereal
---B12F	None	-	12th after fallow 1967
-P-B12F	None	P	12th after fallow 1967
--KB12F	None	K (Na) Mg	12th after fallow 1967
-PKB12F	None	P K (Na) Mg	12th after fallow 1967
A--B12F	A	-	12th after fallow 1967
AP-B12F	A	P	12th after fallow 1967
A-KB12F	A	K (Na) Mg	12th after fallow 1967
APKB12F	A	P K (Na) Mg	12th after fallow 1967
N--B12F	N	-	12th after fallow 1967
NP-B12F	N	P	12th after fallow 1967
N-KB12F	N	K (Na) Mg	12th after fallow 1967
NPKB12F	N	P K (Na) Mg	12th after fallow 1967
N--SB12F	N	Si	12th after fallow 1967
NP-SB12F	N	P Si	12th after fallow 1967
N-KSB12F	N	K (Na) Mg Si	12th after fallow 1967
NPKSB12F	N	P K (Na) Mg Si	12th after fallow 1967
N--B1BE	N	-	1st after beans 1978
NP-B1BE	N	P	1st after beans 1978
N-KB1BE	N	K (Na) Mg	1st after beans 1978
NPKB1BE	N	P K (Na) Mg	1st after beans 1978
N--SB1BE	N	Si	1st after beans 1978
NP-SB1BE	N	P Si	1st after beans 1978
N-KSB1BE	N	K (Na) Mg Si	1st after beans 1978
NPKSB1BE	N	P K (Na) Mg Si	1st after beans 1978
C--B12F	C	-	12th after fallow 1967
CP-B12F	C	P	12th after fallow 1967
C-KB12F	C	K (Na) Mg	12th after fallow 1967
CPKB12F	C	P K (Na) Mg	12th after fallow 1967
C--B2BE	C	-	2nd after beans 1977
CP-B2BE	C	P	2nd after beans 1977
C-KB2BE	C	K (Na) Mg	2nd after beans 1977
CPKB2BE	C	P K (Na) Mg	2nd after beans 1977
C--B1BE	C	-	1st after beans 1978
CP-B1BE	C	P	1st after beans 1978
C-KB1BE	C	K (Na) Mg	1st after beans 1978
CPKB1BE	C	P K (Na) Mg	1st after beans 1978

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C--B1PO	C	-	1st after potatoes 1978
CP-B1PO	C	P	1st after potatoes 1978
C-KB1PO	C	K (Na) Mg	1st after potatoes 1978
CPKB1PO	C	P K (Na) Mg	1st after potatoes 1978
D B12	None	D	12th after fallow 1967
(D) B12	(D)	-	12th after fallow 1967
(A) B12	(Ashes)	-	12th after fallow 1967
- B12	None	-	12th after fallow 1967

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

2. N — Nitrogen 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 AN2PK	12th barley after fallow 1967
561--PK	Plot 561 --PK	12th barley after fallow 1967
571NN2--	Plot 571 NN2	12th barley after fallow 1967
581NN2--	Plot 581 NN2	12th barley after fallow 1967

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

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

Basal applications: Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 kg) in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- P, K and Na applied: 13 Nov, 1978. Chalk applied: 20 Nov. FYM applied: 23 Nov. Ploughed: 24 Nov. Spring-tine cultivated, seed sown: 6 Apr, 1979. N applied: 18 May. Weedkillers applied: 19 May. Fungicide applied: 18 June. Combine harvested: 27 Aug.

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79/R/HB/2

GRAIN TONNES/HECTARE

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

N / MANURE	0	48	96	144	MEAN
---B12F	0.87	1.54	1.49	1.98	1.47
-P-B12F	1.18	3.16	4.25	4.76	3.34
--KB12F	0.55	2.44	2.48	2.80	2.07
-PKB12F	0.65	2.28	4.42	4.51	2.96
A--B12F	0.92	0.84	1.91	1.77	1.36
AP-B12F	1.52	3.44	3.70	3.38	3.01
A-KB12F	0.47	1.20	1.50	2.04	1.30
APKB12F	1.04	2.92	4.19	4.75	3.23
N--B12F	0.65	1.22	1.77	1.27	1.23
NP-B12F	1.89	4.00	4.45	4.58	3.73
N-KB12F	0.99	2.00	2.16	2.60	1.94
NPKB12F	0.40	3.81	4.47	4.63	3.33
N--SB12F	1.56	2.16	2.60	3.81	2.53
NP-SB12F	1.25	4.31	4.64	5.29	3.87
N-KSB12F	0.73	2.42	4.07	4.74	2.99
NPKSB12F	0.96	3.81	5.24	5.43	3.86
N--B1BE	1.69	2.93	4.45	3.74	3.20
NP-B1BE	2.25	5.07	5.86	5.70	4.72
N-KB1BE	2.11	3.70	4.41	4.36	3.64
NPKB1BE	1.87	4.81	6.00	6.46	4.78
N--SB1BE	3.09	3.81	4.55	5.30	4.19
NP-SB1BE	2.47	4.82	5.70	5.90	4.72
N-KSB1BE	1.91	4.38	5.28	5.17	4.18
NPKSB1BE	3.55	4.96	5.57	6.00	5.02
C--B12F	0.92	3.06	4.30	4.61	3.22
CP-B12F	1.42	3.81	5.29	5.18	3.92
C-KB12F	1.31	2.69	4.07	4.07	3.03
CPKB12F	1.77	3.97	5.01	5.24	4.00
C--B2BE	2.01	3.21	4.04	4.54	3.45
CP-B2BE	1.13	3.16	4.76	5.14	3.55
C-KB2BE	1.06	2.70	3.74	4.91	3.10
CPKB2BE	2.58	3.72	5.46	4.67	4.10
C--B1BE	1.68	3.35	4.97	5.18	3.79
CP-B1BE	2.19	4.39	5.74	5.35	4.42
C-KB1BE	2.05	3.55	4.85	4.96	3.85
CPKB1BE	3.16	5.15	4.74	5.57	4.65
C--B1PO	1.73	4.10	4.69	4.69	3.80
CP-B1PO	2.26	4.28	5.82	5.18	4.38
C-KB1PO	1.49	3.36	4.47	4.41	3.43
CPKB1PO	2.16	4.43	5.67	5.71	4.49
D B12	3.31	3.99	5.78	5.18	4.56
(D) B12	1.28	2.27	2.61	3.49	2.41
(A) B12	1.08	2.04	2.85	4.13	2.53
- B12	0.72	1.32	2.21	1.84	1.52
MEAN	1.59	3.29	4.23	4.43	3.38

GRAIN MEAN DM% 78.6

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79/R/HB/2

BARLEY

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---B12F	0.40	0.60	0.80	0.96	0.69
-P-B12F	0.61	1.42	1.96	2.42	1.60
--KB12F	0.39	1.19	1.37	1.55	1.12
-PKB12F	0.39	1.19	2.77	2.61	1.74
A--B12F	0.40	0.40	0.81	0.82	0.61
AP-B12F	0.81	1.42	1.62	1.82	1.42
A-KB12F	0.40	0.59	0.80	1.18	0.74
APKB12F	0.40	1.43	2.44	3.41	1.92
D B12	1.31	2.39	3.42	4.25	2.84
(D) B12	0.52	1.04	1.54	1.81	1.23
(A) B12	0.26	0.80	1.08	2.16	1.08
- B12	0.26	0.80	1.05	1.05	0.79
MEAN	0.51	1.11	1.64	2.00	1.32

STRAW MEAN DM% 88.0

PLOT AREA HARVESTED 0.00007

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
MGNESIUM					
0	3.89	0.36	2.60	0.91	1.94
35	4.18	0.52	1.96	1.59	2.06
MEAN	4.04	0.44	2.28	1.25	2.00

GRAIN MEAN DM% 75.6

PLOT AREA HARVESTED 0.00306

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79/R/WF/3

WHEAT AND FALLOW

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

The 124th year, winter wheat.

For previous years see 'Details' 1967, 1973 and 74-78/R/WF/3.

Whole plot dimensions: 9.60 x 52.1.

Treatments:

PLOT	Plot number and phase of fallowing cycle (up to 1979):-									
-	Plot 1	F	F	F	W	F	W	F	W	F
2 FALL 3	Plot 2	W	F	W	F	W	F	F	F	W
-	Plot 3	F	W	F	F	F	W	F	W	F
-	Plot 4	F	F	W	F	W	F	W	F	F
-	Plot 5	F	W	F	W	F	F	F	W	F
6 FALL 1	Plot 6	W	F	F	F	W	F	W	F	W
-	Plot 7	F	W	F	W	F	W	F	F	F
8 FALL 1	Plot 8	W	F	W	F	F	F	W	F	W

W = wheat, F = fallow.

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

Seed: Flanders, seed dressed chlorfenvinphos, sown at 200 kg.

Cultivations, etc.:-
Wheat plots: Ploughed: 9 Oct, 1978. Rotary harrowed: 10 Oct. Seed sown: 11 Oct. Weedkillers applied: 9 May, 1979. Combine harvested: 28 Aug.
Fallow plots: Ploughed: 9 Oct, 1978. Spring-tine cultivated: 1 May, 1979. Ploughed: 24 May. Heavy spring-tine cultivated: 14 June. Ploughed: 11 July. Heavy spring-tine cultivated: 31 July.

GRAIN TONNES/HECTARE

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

PLOT	6 FALL 1	8 FALL 1	2 FALL 3	MEAN
	1.31	1.16	1.12	1.20

GRAIN MEAN DM% 82.8

STRAW TONNES/HECTARE

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

PLOT	6 FALL 1	8 FALL 1	2 FALL 3	MEAN
	0.37	0.36	0.25	0.33

STRAW MEAN DM% 91.7

PLOT AREA HARVESTED 0.01483

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79/R/EX/4

EXHAUSTION LAND

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

The 124th year, barley.

For previous years see 'Details' 1967, 1973 and 74-78/R/EX/4.

Treatments: All combinations of:-

Whole plots

1. PLOTFERT(01) Plot numbers and manuring 1876-1901:

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

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

Sub plots

2. N Nitrogen 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: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) and mecoprop at 1.7 kg in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Ploughed: 15 Dec, 1978. Spring-tine cultivated, seed sown: 18 Apr, 1979. N applied: 17 May. Weedkillers applied: 15 June. Fungicide applied: 18 June. Combine harvested: 1 Sept.

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79/R/EX/4

GRAIN TONNES/HECTARE

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

N PLOTFERT(01)	0	48	96	144	MEAN
1-	0.44	0.86	1.28	1.22	0.95
2-	0.31	0.63	0.73	1.03	0.67
3D	1.50	3.54	4.57	4.62	3.56
4D	1.00	3.15	2.80	4.08	2.76
5N	0.51	0.95	1.19	1.60	1.06
6N*	0.40	0.57	0.33	0.65	0.49
7NMIN	1.37	2.71	3.93	4.27	3.07
8N*MIN	0.59	2.29	1.05	1.96	1.47
9P	1.29	3.17	4.15	3.89	3.12
10MIN	0.50	2.08	1.32	2.33	1.56
MEAN	0.79	2.00	2.13	2.57	1.87

GRAIN MEAN DM% 81.6

STRAW TONNES/HECTARE

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

N PLOTFERT(01)	0	48	96	144	MEAN
1-	0.37	0.22	0.51	0.51	0.40
2-	0.14	0.15	0.22	0.37	0.22
3D	0.30	1.76	2.64	2.73	1.86
4D	0.15	1.33	1.17	2.05	1.18
5N	0.15	0.44	0.52	0.74	0.46
6N*	0.15	0.15	0.15	0.22	0.17
7NMIN	0.29	1.25	1.97	2.76	1.57
8N*MIN	0.29	0.88	0.36	0.73	0.57
9P	0.30	1.24	2.04	2.44	1.50
10MIN	0.22	0.81	0.43	1.02	0.62
MEAN	0.23	0.82	1.00	1.36	0.85

STRAW MEAN DM% 90.9

SUB PLOT AREA HARVESTED 0.00728

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79/R/PG/5

PARK GRASS

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

The 124th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-78/R/PG/5.

Treatments:

Whole plots

MANURE	Fertilisers and organic manures:-	
N1	Plot 1	N1
0(D)	Plot 2	None (D until 1863)
0/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
0/PLOT12	Plot 12	None
D/F	Plot 13	D/F
N2*MIN	Plot 14	N2* P K Na Mg
MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MIN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

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

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79/R/PG/5

Sub plots

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

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

Additional sub plots (Plots 18, 19 and 20 only) (tonnes $CaCO_3$ 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.:- Superphosphate applied: 17 Nov, 1978. Remaining mineral fertilisers applied: 20 Nov. Fish meal applied: 21 Nov. First N dressing applied: 15 May, 1979. Second N dressing applied: 12 June. Cut twice: 20 June and 2 Oct.

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79/R/PG/5

1ST CUT (20/6/79) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.11	2.68	2.17	0.45	1.85
O(D)	2.00	2.15	1.63	1.37	1.79
O/PLOT3	2.13	2.34	1.25	1.26	1.74
P	2.51	3.24	2.14	2.07	2.49
N2P	2.58	2.52	2.77	1.29	2.29
N1MIN	4.55	4.08			4.31
MIN	4.02	4.59	2.71	1.99	3.33
PNAMG	2.83	2.76	2.92	2.49	2.75
N2MIN	4.60	4.46	4.23	3.07	4.09
N2PNAMG	3.44	3.31	3.44	2.32	3.13
N3MIN	4.16	5.14	4.16	2.01	3.87
N3MINSI	4.77	4.75	4.91	3.04	4.37
O/PLOT12	2.94	2.65	2.16	2.27	2.51
D/F	4.35	5.35	4.50	4.45	4.66
N2*MIN	3.77	4.58	4.36	3.65	4.09
MIN(N2*)	3.90	3.42	1.40	1.69	2.60
N1*MIN	4.62	4.10	3.81	3.32	3.96
N1*	2.28	2.59	2.23	1.88	2.25
N2KNAMG0			1.21	1.18	1.19
N2KNAMG2	2.45				2.45
N2KNAMG1	2.41	2.53			2.47
D0	4.16				4.16
D2	4.13				4.13
D1	4.40				4.40
D/N*PK0	4.86				4.86
D/N*PK2	4.89				4.89
D/N*PK1	4.41				4.41

1ST CUT MEAN DM% 23.0

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79/R/PG/5

2ND CUT (2/10/78) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	1.54	2.00	0.72	0.45	1.18
O(D)	1.41	1.63	0.90	1.25	1.30
O/PLOT3	1.43	1.70	1.06	1.07	1.32
P	1.55	1.80	1.60	1.40	1.59
N2P	1.37	1.50	0.98	1.52	1.34
N1MIN	2.35	2.33			2.34
MIN	2.70	2.90	1.68	1.23	2.13
PNAMG	1.80	1.65	1.72	1.51	1.67
N2MIN	2.09	2.64	1.26	0.86	1.71
N2PNAMG	1.37	1.40	1.18	0.89	1.21
N3MIN	2.79	2.53	1.82	3.52	2.66
N3MINSI	3.59	2.55	2.23	3.97	3.08
O/PLOT12	2.81	1.23	1.36	1.35	1.69
D/F	2.76	3.04	2.33	1.99	2.53
N2*MIN	2.19	2.77	2.76	2.25	2.49
MIN(N2*)	2.29	2.72	1.12	1.45	1.89
N1*MIN	1.98	2.12	1.87	1.71	1.92
N1*	1.63	2.22	1.87	1.94	1.92
N2KNAMG0			0.52	0.55	0.54
N2KNAMG2	1.57				1.57
N2KNAMG1	1.60	1.71			1.66
D0	2.01				2.01
D2	2.39				2.39
D1	2.15				2.15
D/N*PK0	2.37				2.37
D/N*PK2	2.78				2.78
D/N*PK1	2.75				2.75

2ND CUT MEAN DM% 31.2

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79/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	3.64	4.67	2.89	0.89	3.02
O(D)	3.41	3.78	2.54	2.62	3.09
O/PLOT3	3.56	4.04	2.31	2.33	3.06
P	4.06	5.04	3.75	3.47	4.08
N2P	3.95	4.02	3.75	2.81	3.63
N1MIN	6.90	6.41			6.66
MIN	6.72	7.49	4.39	3.23	5.46
PNAMG	4.63	4.41	4.64	4.00	4.42
N2MIN	6.69	7.10	5.48	3.93	5.80
N2PNAMG	4.81	4.71	4.62	3.21	4.34
N3MIN	6.95	7.67	5.98	5.53	6.53
N3MINSI	8.36	7.30	7.14	7.01	7.45
O/PLOT12	5.75	3.88	3.52	3.63	4.20
D/F	7.11	8.40	6.82	6.44	7.19
N2*MIN	5.96	7.35	7.11	5.91	6.58
MIN(N2*)	6.19	6.14	2.52	3.14	4.50
N1*MIN	6.60	6.22	5.68	5.03	5.88
N1*	3.91	4.81	4.10	3.82	4.16
N2KNAMG0			1.73	1.73	1.73
N2KNAMG2	4.02				4.02
N2KNAMG1	4.02	4.24			4.13
D0	6.17				6.17
D2	6.53				6.53
D1	6.54				6.54
D/N*PK0	7.23				7.23
D/N*PK2	7.67				7.67
D/N*PK1	7.16				7.16

TOTAL OF 2 CUTS MEAN DM% 27.1

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79/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 tenth year of revised scheme, ryegrass and beans.

For previous yers see 'Details' 1967 and 1973, and 74-78/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

2. RN CROP — Rotation 1848-1951 and crop:

F/BEANS	With fallow: Roots (turnips or swedes), barley, fallow, wheat 1848-1951. Beans (after grass/clover 1977 & 1978)
L/GRASS	With legume: Roots, barley, legume (clover or beans), wheat 1848-1951. Grass 1977-1979.

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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79/R/AG/6

Sixteenth plots

5. P_2O_5 64 K_2O 64

Rates of 1964 treatments (kg):

P_2O_5 to P-test half plots	K_2O to K-test half plots
0	0
500	315
1000	630
2000	1260

Thirty second plots

6.

On P-test half plots:
To RN CROP F/BEANS. Residues of P_2O_5 applied 1970-72 (total, kg) and a fresh dressing in 1979 (kg):

P_2O_5 729

(0)0
(375)150

To RN CROP L/GRASS. Residues of P_2O_5 applied 1970-72 (total, kg):

P_2O_5 72

0
375

On K-test half plots:
To RN CROP F/BEANS. Residues of K_2O applied 1973-76 (total, kg) and a fresh dressing in 1979 (kg):

K_2O 769

(0)0
(870)300

To RN CROP L/GRASS. Residues of K_2O applied 1973-76 (total, kg):

K_2O 76

0
870

NOTE: L/GRASS plots were ploughed on 18 July. Yields were not taken.

Standard applications: Beans: Manures: P at 65 kg as superphosphate to K-test half plots. K at 250 kg as muriate of potash to P-test half plots.
Weedkiller: Trietazine with simazine (as 'Remtal SC' at 2.8 kg) in 340 l.
Insecticide: Pirimicarb at 0.14 kg in 340 l applied twice.
Grass: Manures: 'Nitro-Chalk' at 380 kg. Weedkiller: Glyphosate at 1.5 kg in 220 l.

Seed: Minden, sown at 220 kg.

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79/R/AG/6

Cultivations, etc.:- Beans: Basal P and K applied: 28 Nov, 1978. Test P and K applied: 7 Dec. Ploughed: 23 Jan, 1979. Rotary harrowed, seed sown: 23 Apr. Weedkiller applied: 13 May. Insecticide applied: 22 June and 12 July. Combine harvested: 14 Sept.
Grass: N applied: 7 Mar, 1979. Weedkiller applied: 12 June. Cut: 28 June.

BEANS

P - TEST PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 729	(0)0	(375)150	(0)0	(375)150	(0)0	(375)150
PREVCROP	P205 64						
ARABLE	0	2.06	2.55	3.36	3.22	2.63	3.03
	500	2.67	3.21	2.54	2.25	3.38	2.91
	1000	2.25	4.40	2.50	2.25	2.62	3.12
	2000	1.69	2.32	2.73	2.56	2.01	2.49
GRASS	0	1.69	2.67	2.17	1.66	1.69	2.09
	500	2.48	3.14	2.14	3.05	2.34	2.90
	1000	3.20	3.03	2.14	1.44	2.26	2.09
	2000	3.57	3.22	3.42	3.52	2.50	2.66

GRAIN MEAN DM% 86.7

PLOT AREA HARVESTED 0.00128

BEANS

K - TEST PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 769	(0)0	(870)300	(0)0	(870)300	(0)0	(870)300
PREVCROP	K20 64						
ARABLE	0	0.89	1.25	2.23	2.38	2.17	2.49
	315	1.16	0.99	2.31	2.55	3.28	2.48
	630	2.44	3.40	2.79	2.89	2.08	2.49
	1260	2.58	3.05	3.05	3.03	1.69	2.40
GRASS	0	1.52	2.16	1.58	3.11	2.01	2.10
	315	1.44	2.94	3.03	3.03	1.52	2.24
	630	2.48	2.94	2.23	2.91	1.93	3.15
	1260	1.78	2.29	2.86	2.92	1.93	2.58

GRAIN MEAN DM% 86.6

PLOT AREA HARVESTED 0.00128

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79/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 fifth year of Italian ryegrass on the rest of the experiment.

For previous years see 'Details' 1967 & 1973 and 74-78/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 and D treatments were applied to Sections 1 and 2, fallow in 1979.

Standard applications: Fallow: Weedkiller: Paraquat at 0.84 kg ion in 220 l.

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79/R/BN/7

Cultivations, etc.:- Ryegrass and fallow: P applied: 7 Nov, 1978. K applied: 8 Nov.
Ryegrass: N applied: 6 Mar, 1979, 13 June and 27 July. Cut: 30 May, 25 July and 1 Oct.
Fallow: FYM applied: 9 Nov, 1978. Spring-tine cultivated: 1 May, 1979 and 3 Oct. Rotary harrowed: 7 June. Cultivated with thistle bar: 3 July. Heavy spring-tine harrowed: 9 July. Weedkiller applied: 14 Sept.

1ST CUT (30/5/79) DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	4.03	3.34	3.18	2.79	3.33
DNPK	4.21	3.54	3.35	3.21	3.58
NPKMG	2.76	2.34	2.31	2.23	2.41
NP	2.54	1.65	1.88	1.85	1.98
NPK	2.81	1.97	2.09	1.82	2.17
NPMG	2.17	1.53	1.77	1.93	1.85
N	1.15	2.05	1.81	2.30	1.83
MEAN	2.81	2.35	2.34	2.30	2.45

MANURE NKMG 2.26

GRAND MEAN 2.44

1ST CUT MEAN DM% 23.4

2ND CUT (25/7/79) DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	2.69	2.70	2.55	2.70	2.66
DNPK	2.60	2.50	2.45	3.00	2.64
NPKMG	1.42	1.50	1.67	1.60	1.55
NP	0.90	0.88	1.10	1.10	1.00
NPK	1.27	1.33	1.79	1.31	1.42
NPMG	1.02	0.68	1.11	1.23	1.01
N	1.10	0.72	0.88	1.10	0.95
MEAN	1.57	1.47	1.65	1.72	1.60

MANURE NKMG 0.92

GRAND MEAN 1.58

2ND CUT MEAN DM% 32.1

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79/R/BN/7

3RD CUT (1/10/79) DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	2.95	3.00	3.54	3.35	3.21
DNPK	2.78	3.03	3.34	3.24	3.10
NPKMG	2.79	2.75	2.88	2.72	2.78
NP	2.35	2.13	2.19	2.14	2.20
NPK	2.97	2.92	2.99	2.93	2.95
NPMG	2.48	2.07	2.58	2.30	2.36
N	2.26	2.54	2.31	2.10	2.30
MEAN	2.66	2.63	2.83	2.68	2.70

MANURE NKMG 2.72

GRAND MEAN 2.70

3RD CUT MEAN DM% 28.2

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	9.67	9.04	9.28	8.83	9.21
DNPK	9.59	9.07	9.14	9.45	9.31
NPKMG	6.97	6.59	6.85	6.54	6.74
NP	5.79	4.67	5.17	5.09	5.18
NPK	7.05	6.21	6.87	6.06	6.55
NPMG	5.67	4.29	5.46	5.47	5.22
N	4.51	5.31	5.00	5.50	5.08
MEAN	7.04	6.45	6.83	6.71	6.75

MANURE NKMG 5.90

GRAND MEAN 6.73

TOTAL OF 3 CUTS MEAN DM% 27.9

SUB PLOT AREA HARVESTED 0.00568

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79/R/GC/8

GARDEN CLOVER

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

The 126th year, red clover.

For previous years see 'Details' 1967 & 1973, and 74-78/R/GC/8.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. VARIETY	Varieties:	
	H(H)	Hungaropoly (resistant to Sclerotinia trifoliorum) in 1979 after Hungaropoly in 1976-78
	H(S)	Hungaropoly in 1979 after S.123 (susceptible to S. trifoliorum) in 1976-78
2. ALDICARB	Aldicarb to seedbed:	
	10(0)	10 kg in 1979 after none in 1976-78
	10(10)	10 kg in 1979 after 10 kg in 1976-78

Basal applications: Manures: Chalk at 7.5 t. (0:14:28) at 540 kg. Mg at 50 kg, as Epsom salts. N at 130 kg, as 'Nitro-Chalk', in seedbed and after each cut except the last.

Seed: Hungaropoly, sown at 34 kg.

Cultivations, etc.:- Hand dug, root stumps carted: 12 Oct, 1978. Chalk applied: 26 Feb, 1979. PK and Mg applied: 17 Apr. Sown, aldicarb and N applied: 20 Apr. Cut and N applied: 25 July, 28 August. Cut: 24 September.

NOTE: Samples of herbage were analysed for percentage N, P, K, Ca and Mg.

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79/R/GC/8

1ST CUT (25/7/79) DRY MATTER TONNES/HECTARE

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

ALDICARB VARIETY	10(0)	10(10)	MEAN
H(H)	2.50	2.32	2.41
H(S)	2.67	2.24	2.45
MEAN	2.58	2.28	2.43

1ST CUT MEAN DM% 23.0

2ND CUT (28/8/79) DRY MATTER TONNES/HECTARE

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

ALDICARB VARIETY	10(0)	10(10)	MEAN
H(H)	3.30	3.31	3.30
H(S)	3.21	3.13	3.17
MEAN	3.26	3.22	3.24

2ND CUT MEAN DM% 12.3

3RD CUT (24/9/79) DRY MATTER TONNES/HECTARE

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

ALDICARB VARIETY	10(0)	10(10)	MEAN
H(H)	1.22	1.26	1.24
H(S)	1.29	1.20	1.25
MEAN	1.26	1.23	1.24

3RD CUT MEAN DM% 15.9

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

ALDICARB VARIETY	10(0)	10(10)	MEAN
H(H)	7.01	6.89	6.95
H(S)	7.18	6.57	6.87
MEAN	7.09	6.73	6.91

TOTAL OF 3 CUTS MEAN DM% 17.1

PLOT AREA HARVESTED 0.00010

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79/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 81st year, grass, grass/clover, winter beans, winter wheat, winter barley.

For previous years see 'Details' 1967 & 1973, and 74-78/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. In 1978 lucerne was replaced by a grass/clover mixture (the OLDTREAT sub-plots form a part of the Grass area).

TREATMENT 1899-1965	OLDTREAT Grass	NEWTREAT Grass/Clover	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
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) Yields were not taken from OLDTREAT grass. NEWTREAT grass/clover was ploughed on 24 May, 1979, yields were not taken.

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79/S/RN/1

In 1977 lucerne was ploughed on one pair of blocks and the area divided into three for 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 grass/clover 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

Winter beans	Winter wheat and winter 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 = 148 kg - 50 kg in autumn 98 kg in spring.

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

0
63

NOTE: Bone meal to arable crops was omitted in 1978. Two dressings were applied for 1979 crops.

Standard applications:
Wheat: Weedkillers: Autumn: Isoproturon at 3.1 kg in 220 l. Spring: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l applied with tridemorph and chlormequat. Fungicide: Tridemorph at 0.53 kg. Growth regulator: Chlormequat at 1.7 kg.
Barley: Weedkillers: Autumn: Isoproturon at 3.1 kg in 220 l. Spring: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l applied with the fungicides. Fungicides: Carbendazim (as 'Bavistin' at 0.51 kg), and tridemorph at 0.53 kg.
Beans: Weedkillers: Simazine at 1.1 kg in 220 l. Fungicide: Benomyl at 0.28 kg in 280 l.

Seed: Wheat: Maris Huntsman, sown at 210 kg.
Barley: Sonja, sown at 160 kg.
Beans: Throws MS, sown at 250 kg.
Grass/Clover: Blanca white clover and S23 PRG sown at 40 kg.

Cultivations, etc.:
Wheat and Barley: PK and bone meal applied: 19 Sept, 1978. N applied, seed sown: 4 Oct. Isoproturon applied: 5 Oct. Bone meal and N applied: 10 Apr, 1979.
Wheat: Ploughed: 3 Oct, 1978. Spring weedkiller, fungicide and growth regulator applied: 15 May, 1979. Combine harvested: 21 Aug.

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Barley: Spring weedkiller and fungicides applied: 15 May, 1979. Combine harvested: 8 Aug.
Beans: P, K and bone meal applied, seed sown: 13 Oct, 1978. Weedkiller applied: 14 Oct. Bone meal applied: 10 Apr, 1979. Fungicide applied: 16 May. Combine harvested: 22 Aug.
OLDTREAT Grass: N, P and K applied: 6 Mar, 1979. Bone meal applied: 10 Apr.
NEWTREAT Grass: P and K applied: 6 Mar, 1979. Bone meal applied: 10 Apr. N applied twice: 18 Apr, 9 July. Cut twice: 12 June and 11 Sept.
NEWTREAT Grass/Clover (after lucerne 1978): Ploughed: 23 June, 1978. Seed sown: 15 Aug. P and K applied: 6 Mar, 1979. Bone meal applied: 10 Apr.

79/S/RN/1 GRASS NEW TREAT

DRY MATTER TONNES/HECTARE

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

	1ST CUT(12/6/79)	2ND CUT(11/9/79)	TOTAL OF 2 CUTS
MANURE			
(D)N	5.91	1.87	7.78
BN	5.11	1.71	6.82
(N)P2N	5.40	1.51	6.90
(P)P1N	5.71	1.61	7.32
(K)P2KN	6.24	1.98	8.22
(-)P2N	5.60	1.59	7.19
(PK)P1KN	6.11	1.76	7.87
(NK)P2KN	6.18	1.94	8.12
(NP)P1N	5.65	1.59	7.23
(NPK)P1KN	5.72	1.75	7.47
MEAN	5.76	1.73	7.49
MEAN DM%	21.9	35.4	28.7

1ST CUT PLOT AREA HARVESTED 0.00089

2ND CUT PLOT AREA HARVESTED 0.00084

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79/S/RN//1

WINTER BEANS

GRAIN TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2	3.31	4.02	3.67
B	2.33	3.26	2.79
(N)P2	1.33	3.00	2.16
(P)P1	2.87	2.67	2.77
(K)P2K	4.34	4.27	4.31
(-)P2	3.03	3.88	3.45
(PK)P1K	4.31	4.00	4.15
(NK)P2K	3.96	4.24	4.10
(NP)P1	2.26	3.29	2.78
(NPK)P1K	3.50	3.65	3.57
MEAN	3.12	3.63	3.38

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

TABLE	POTASH	MANURE* POTASH
SED	0.070	0.222

* WITHIN SAME LEVEL OF MANURE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.251	7.4
BLOCK.WP.SP	10	0.222	6.6

SUB PLOT AREA HARVESTED 0.00075

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79/S/RN/1

WINTER WHEAT

GRAIN TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	8.63	8.52	8.57
BN	7.83	7.99	7.91
(N)P2N	7.96	8.51	8.24
(P)P1N	7.95	8.36	8.16
(K)P2KN	8.44	8.53	8.49
(-)P2N	8.60	8.08	8.34
(PK)P1KN	8.39	8.23	8.31
(NK)P2KN	8.21	8.20	8.20
(NP)P1N	7.84	8.00	7.92
(NPK)P1KN	7.87	7.98	7.92
MEAN	8.17	8.24	8.21

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

TABLE	POTASH	MANURE* POTASH
SED	0.117	0.371

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.283	3.4
BLOCK.WP.SP	10	0.371	4.5

GRAIN MEAN DM% 81.0

STRAW TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	4.95	5.33	5.14
BN	4.78	4.78	4.78
(N)P2N	4.61	4.98	4.79
(P)P1N	4.89	5.14	5.02
(K)P2KN	5.06	5.23	5.14
(-)P2N	4.95	4.84	4.90
(PK)P1KN	5.29	5.00	5.14
(NK)P2KN	4.73	5.18	4.96
(NP)P1N	4.42	4.72	4.57
(NPK)P1KN	5.12	4.94	5.03
MEAN	4.88	5.01	4.95

STRAW MEAN DM% 84.5

SUB PLOT AREA HARVESTED 0.00075

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79/S/RN/1

WINTER BARLEY

GRAIN TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	7.84	7.27	7.55
BN	7.00	6.92	6.96
(N)P2N	7.06	6.62	6.84
(P)P1N	7.05	6.83	6.94
(K)P2KN	6.95	6.91	6.93
(-)P2N	5.74	7.11	6.42
(PK)P1KN	7.17	5.64	6.40
(NK)P2KN	6.79	7.24	7.02
(NP)P1N	6.25	6.93	6.59
(NPK)P1KN	6.43	7.26	6.84
MEAN	6.83	6.87	6.85

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

TABLE	POTASH	MANURE* POTASH
SED	0.278	0.879

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.392	5.7
BLOCK.WP.SP	10	0.879	12.8

GRAIN MEAN DM% 81.8

STRAW TONNES/HECTARE

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

POTASH MANURE	0	63	MEAN
(D)P2N	4.59	3.72	4.16
BN	3.22	3.83	3.53
(N)P2N	3.52	3.43	3.48
(P)P1N	3.70	3.23	3.46
(K)P2KN	3.58	3.86	3.72
(-)P2N	3.32	3.76	3.54
(PK)P1KN	4.16	3.04	3.60
(NK)P2KN	4.12	3.39	3.76
(NP)P1N	2.60	3.47	3.04
(NPK)P1KN	3.59	4.45	4.02
MEAN	3.64	3.62	3.63

STRAW MEAN DM% 88.3

SUB PLOT AREA HARVESTED 0.00075

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79/S/RN/2

ROTATION II

Object: To measure, by crop yields and soil analysis, the residual value of P applied as FYM or superphosphate in the periods 1899-1964 and 1965-1967 and of fresh dressings since - Saxmundham.

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

The tenth year of revised scheme, wheat, barley.

For previous years see 'Details' 1967 & 1973, and 74-78/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 since 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

Wheat in 1979 (after barley 1978) tests in addition to 1:-

Sub plots

2. P — Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1978 (to preceding wheat stubble)
(0)(0)0	0	0	0
(0)(3)0	0	378	0
(1)(3)1	126	378	120
(2)(3)1	252	378	120
(3)(3)0	378	378	0

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and some of the combinations of 2 with:-

3. N Nitrogen fertiliser (kg N as 'Nitro-Chalk') (in addition to autumn basal N):

40
80
120
160

Barley in 1979 (after wheat 1978) tests in addition to 1:

Sub plots

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1979 (to preceding wheat stubble)
(0)(0)0	0	0	0
(0)(3)0	0	378	0
(1)(3)1	126	378	120
(2)(3)1	252	378	120
(3)(3)0	378	378	0

and some of the combinations of 2 with:-

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

30
60
90
120

Standard applications:
Both crops: Manures: K20 at 150 kg as muriate of potash. Spring weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 220 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg.
Wheat: Manures: N at 50 kg at drilling as 'Nitro-Chalk 25' combine drilled. Autumn weedkiller: Isoproturon at 3.1 kg in 220 l. Growth regulator: Chlormequat at 1.7 kg, applied with the spring weedkiller.

Seed: Wheat: Maris Huntsman, sown at 210 kg.
Barley: Julia, sown at 190 kg.

Cultivations, etc.:-
Both crops: K applied: 20 Sept, 1978. Ploughed: 22 Sept. Test N applied: 18 Apr, 1979. Combine harvested: 21 Aug.
Wheat: Seed sown: 4 Oct, 1978. Isoproturon applied: 5 Oct. Spring weedkiller, fungicide and growth regulator applied: 15 May, 1979.
Barley: Test P applied: 20 Sept, 1978. Seed sown: 18 Apr, 1979. Weedkiller and fungicide applied: 23 May.

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79/S/RN/2

WHEAT

GRAIN TONNES/HECTARE

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

RESIDUE	N P	40	80	120	160
(0)0	(0)(0)0			3.23	3.34
(0)0	(0)(3)0	3.46	3.94		
(0)0	(1)(3)1	4.15		5.38	
(0)0	(2)(3)1		5.15		6.37
(0)0	(3)(3)0		4.80		5.11
(D)0	(0)(0)0	2.71	4.61		
(D)0	(0)(3)0			4.93	6.09
(D)0	(1)(3)1		5.77		6.11
(D)0	(2)(3)1	3.91		6.20	
(D)0	(3)(3)0	3.45		5.32	
(DP)0	(0)(0)0			6.12	6.03
(DP)0	(0)(3)0	3.84	5.85		
(DP)0	(1)(3)1	4.52		6.37	
(DP)0	(2)(3)1		5.50		6.86
(DP)0	(3)(3)0		5.74		6.53
(DP)D2	(0)(0)0	4.27	4.70		
(DP)D2	(0)(3)0			5.69	6.32
(DP)D2	(1)(3)1	4.38		6.43	
(DP)D2	(2)(3)1		6.20		6.49
(DP)D2	(3)(3)0		5.64		5.86
(DP)D2P1	(0)(0)0			6.16	6.96
(DP)D2P1	(0)(3)0	4.63	5.28		
(DP)D2P1	(1)(3)1	3.96		7.14	
(DP)D2P1	(2)(3)1		6.30		6.73
(DP)D2P1	(3)(3)0		6.49		6.80
(DP)P1	(0)(0)0			6.22	6.50
(DP)P1	(0)(3)0	5.18	5.16		
(DP)P1	(1)(3)1		5.85		7.39
(DP)P1	(2)(3)1	4.30		6.56	
(DP)P1	(3)(3)0	4.18		7.19	
(DP)P2	(0)(0)0	4.05	5.66		
(DP)P2	(0)(3)0			6.38	6.38
(DP)P2	(1)(3)1		5.70		7.10
(DP)P2	(2)(3)1	4.92		6.67	
(DP)P2	(3)(3)0	4.94		6.94	
(DP52)0	(0)(0)0	4.13	5.32		
(DP52)0	(0)(3)0			5.70	6.82
(DP52)0	(1)(3)1		5.53		6.36
(DP52)0	(2)(3)1	3.39		6.71	
(DP52)0	(3)(3)0	4.13		6.20	

GRAIN MEAN DM% 79.4

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79/S/RN/2

WHEAT

STRAW TONNES/HECTARE

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

RESIDUE	N P	40	80	120	160
(0)0	(0)(0)0			1.87	1.99
(0)0	(0)(3)0	2.31	2.04		
(0)0	(1)(3)1	2.78		3.46	
(0)0	(2)(3)1		3.27		3.89
(0)0	(3)(3)0		3.17		2.93
(D)0	(0)(0)0	1.96	2.59		
(D)0	(0)(3)0			2.91	3.45
(D)0	(1)(3)1		3.55		4.02
(D)0	(2)(3)1	1.91		4.31	
(D)0	(3)(3)0	1.89		3.73	
(DP)0	(0)(0)0			3.61	4.03
(DP)0	(0)(3)0	2.18	3.69		
(DP)0	(1)(3)1	2.67		3.92	
(DP)0	(2)(3)1		3.44		3.94
(DP)0	(3)(3)0		3.61		4.59
(DP)D2	(0)(0)0	2.56	2.85		
(DP)D2	(0)(3)0			3.03	4.11
(DP)D2	(1)(3)1	2.82		4.15	
(DP)D2	(2)(3)1		3.61		4.10
(DP)D2	(3)(3)0		3.46		3.59
(DP)D2P1	(0)(0)0			4.25	4.06
(DP)D2P1	(0)(3)0	2.94	3.44		
(DP)D2P1	(1)(3)1	2.72		4.65	
(DP)D2P1	(2)(3)1		3.27		4.44
(DP)D2P1	(3)(3)0		4.37		4.67
(DP)P1	(0)(0)0			3.86	3.68
(DP)P1	(0)(3)0	3.12	3.15		
(DP)P1	(1)(3)1		3.42		5.34
(DP)P1	(2)(3)1	3.12		4.16	
(DP)P1	(3)(3)0	2.19		4.27	
(DP)P2	(0)(0)0	2.31	3.68		
(DP)P2	(0)(3)0			4.09	4.19
(DP)P2	(1)(3)1		3.31		4.21
(DP)P2	(2)(3)1	2.79		4.14	
(DP)P2	(3)(3)0	2.88		4.59	
(DP52)0	(0)(0)0	2.64	3.25		
(DP52)0	(0)(3)0			3.55	4.38
(DP52)0	(1)(3)1		3.55		4.02
(DP52)0	(2)(3)1	2.00		3.95	
(DP52)0	(3)(3)0	2.81		3.85	

STRAW MEAN DM% 89.5

SUB PLOT AREA HARVESTED 0.00075

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79/S/RN/2

BARLEY

GRAIN TONNES/HECTARE

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

RESIDUE	N P	30	60	90	120
(0)0	(0)(0)0	1.54	1.69		
(0)0	(0)(3)0			1.85	3.53
(0)0	(1)(3)1		3.62		4.65
(0)0	(2)(3)1	2.02		3.62	
(0)0	(3)(3)0	1.80		3.91	
(D)0	(0)(0)0			3.03	3.40
(D)0	(0)(3)0	2.59	3.21		
(D)0	(1)(3)1	2.85		4.85	
(D)0	(2)(3)1		3.65		5.20
(D)0	(3)(3)0		4.05		4.61
(DP)0	(0)(0)0	1.91	3.12		
(DP)0	(0)(3)0			4.60	4.27
(DP)0	(1)(3)1		3.49		4.40
(DP)0	(2)(3)1	2.75		4.66	
(DP)0	(3)(3)0	2.20		4.11	
(DP)D2	(0)(0)0			5.02	4.92
(DP)D2	(0)(3)0	2.67	3.85		
(DP)D2	(1)(3)1		3.71		4.94
(DP)D2	(2)(3)1	2.37		5.32	
(DP)D2	(3)(3)0	2.21		4.53	
(DP)D2P1	(0)(0)0	2.09	4.25		
(DP)D2P1	(0)(3)0			4.10	5.13
(DP)D2P1	(1)(3)1		3.55		4.88
(DP)D2P1	(2)(3)1	2.36		4.96	
(DP)D2P1	(3)(3)0	3.01		4.99	
(DP)P1	(0)(0)0	1.77	4.25		
(DP)P1	(0)(3)0			5.09	4.77
(DP)P1	(1)(3)1	2.52		5.12	
(DP)P1	(2)(3)1		4.01		5.40
(DP)P1	(3)(3)0		3.71		5.08
(DP)P2	(0)(0)0			4.39	4.78
(DP)P2	(0)(3)0	2.37	2.67		
(DP)P2	(1)(3)1	2.09		4.36	
(DP)P2	(2)(3)1		4.14		5.75
(DP)P2	(3)(3)0		3.83		4.32
(DP52)0	(0)(0)0			3.71	3.60
(DP52)0	(0)(3)0	2.05	3.74		
(DP52)0	(1)(3)1	1.83		3.45	
(DP52)0	(2)(3)1		3.70		4.94
(DP52)0	(3)(3)0		2.94		4.37

GRAIN MEAN DM% 78.0

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79/S/RN/2

BARLEY

STRAW TONNES/HECTARE

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

RESIDUE	N P	30	60	90	120
(0)0	(0)(0)0	1.07	1.27		
(0)0	(0)(3)0			1.44	2.55
(0)0	(1)(3)1		2.28		3.00
(0)0	(2)(3)1	1.40		2.56	
(0)0	(3)(3)0	0.76		2.84	
(D)0	(0)(0)0			2.39	2.76
(D)0	(0)(3)0	1.98	1.90		
(D)0	(1)(3)1	1.68		3.36	
(D)0	(2)(3)1		2.21		3.50
(D)0	(3)(3)0		2.58		3.39
(DP)0	(0)(0)0	1.15	1.86		
(DP)0	(0)(3)0			3.23	3.21
(DP)0	(1)(3)1		2.35		3.04
(DP)0	(2)(3)1	1.28		3.50	
(DP)0	(3)(3)0	1.31		2.63	
(DP)D2	(0)(0)0			3.24	3.82
(DP)D2	(0)(3)0	1.36	2.60		
(DP)D2	(1)(3)1		2.43		3.60
(DP)D2	(2)(3)1	1.47		3.82	
(DP)D2	(3)(3)0	1.26		3.53	
(DP)D2P1	(0)(0)0	1.49	2.88		
(DP)D2P1	(0)(3)0			2.81	3.62
(DP)D2P1	(1)(3)1		2.44		3.54
(DP)D2P1	(2)(3)1	1.44		3.97	
(DP)D2P1	(3)(3)0	1.22		3.44	
(DP)P1	(0)(0)0	1.20	3.09		
(DP)P1	(0)(3)0			3.68	3.56
(DP)P1	(1)(3)1	0.89		3.56	
(DP)P1	(2)(3)1		2.87		3.83
(DP)P1	(3)(3)0		2.20		3.87
(DP)P2	(0)(0)0			2.93	3.52
(DP)P2	(0)(3)0	2.06	1.67		
(DP)P2	(1)(3)1	1.40		3.20	
(DP)P2	(2)(3)1		2.78		3.84
(DP)P2	(3)(3)0		2.63		3.26
(DP52)0	(0)(0)0			2.62	2.99
(DP52)0	(0)(3)0	1.24	2.43		
(DP52)0	(1)(3)1	1.11		2.23	
(DP52)0	(2)(3)1		2.54		3.36
(DP52)0	(3)(3)0		1.78		3.45

STRAW MEAN DM% 78.3

SUB PLOT AREA HARVESTED 0.00075

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79/R/RN/1 and 79/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 were introduced on these blocks - Highfield and Fosters.

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

The 31st year, old grass, leys, oats, potatoes, beans, barley, wheat.

For previous years see 'Details' 1967 & 1973 and 74-78/R/RN/1&2.

The experiment is duplicated on:-

HIGHFIELD — A site with much organic matter initially (ploughed out from permanent grass) (79/R/RN/1)

FOSTERS — A site with little organic matter initially (79/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 un-ploughed, 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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79/R/RN/1 and 79/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, 1978 and 1979 one phase, fallowed in the previous year started a new sequence of treatment cropping. In 1979 the remaining phase was fallowed prior to introducing the new sequences in 1980. 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 1st test crop potatoes in the original rotation:-

Sub plots

FYMRES68 Farmyard manure residues, last applied 1968:

NONE None
FYM 30 tonnes on each occasion

Sub plots

N 79 Nitrogen fertiliser (kg N as 'Nitro-Chalk'):

0
80
160
240

Standard applications:
Museum blocks:
1st Treatment crops:
All-grass ley and clover-grass ley: (0:14:28) at 540 kg. Weedkillers: Glyphosate at 1.5 kg in 220 l, paraquat at 0.70 kg ion in 220 l, MCPA at 0.26 kg and MCPB at 1.6 kg in 220 l.
All-grass ley only: 'Nitro-Chalk' at 290 kg.
Lucerne: Manures: (0:20:20) at 380 kg. Weedkillers: Glyphosate at 1.5 kg in 220 l, paraquat at 0.70 kg ion, 2,4-DB at 1.8 kg in 220 l.

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79/R/RN/1 and 79/R/RN/2

1-year seeds hay: Manures: (0:14:28) at 540 kg. 'Nitro-Chalk' at 290 kg. Weedkillers: Paraquat at 0.70 kg ion. MCPA at 0.26 kg and MCPB at 1.6 kg in 220 l.

1st Test crop:

Potatoes: Manures: (0:20:20) at 1500 kg. Weedkillers: Paraquat at 0.42 kg ion with linuron at 1.1 kg in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l applied four times with and twice without pirimicarb. Insecticides: Phorate granules (at planting) at 1.7 kg, pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Reseeded grass and Old grass: Manures: (0:14:28) at 540 kg.

All-grass half plots: Manures: (25:0:16) at 300 kg in spring, and after each cut except the last.

New sequence blocks:

1st Treatment crops:

All crops: Manures: Chalk at 8.7 t, Highfield only.

Lucerne: Manures: (0:14:28) at 720 kg. Weedkillers: 2,4-DB at 1.8 kg in 220 l.

Clover-grass ley: Manures: (0:14:28) at 720 kg (25:0:16) at 300 kg. Weedkillers: MCPA at 0.26 kg with MCPB at 1.6 kg in 220 l.

Ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg. Weedkillers: MCPA at 0.26 kg with MCPB at 1.6 kg in 220 l.

Oats and Barley: Manures: (20:14:14) at 350 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) with mecoprop at 1.7 kg in 220 l. Fungicide (to barley only): Tridemorph at 0.53 kg in 220 l.

2nd Treatment crops:

Lucerne: Manures: (0:14:28) at 720 kg. Weedkillers: Propyzamide at 0.70 kg in 220 l.

Clover-grass ley and Ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg in spring, repeated (ryegrass only) after each cut except the last.

Potatoes: Manures: (13:13:20) at 1500 kg. Weedkillers: Paraquat at 0.42 kg ion with linuron at 1.1 kg in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l applied four times with and twice without pirimicarb. Insecticides: Phorate granules (at planting) at 1.7 kg, pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Barley: Manures: (20:14:14) at 350 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) with mecoprop at 1.7 kg in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.

3rd Treatment crops:

Lucerne: Manures: (0:14:28) at 720 kg. Weedkillers: Propyzamide at 0.70 kg in 220 l.

Clover-grass ley and Ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg in spring, repeated (ryegrass only) after each cut except the last.

Beans: Insecticide: Pirimicarb at 0.14 kg in 220 l, applied twice.

Wheat: Manures: (0:20:20) at 250 kg, combine drilled. 'Nitro-Chalk' at 380 kg. Weedkillers: Mecoprop at 2.5 kg with isoproturon at 2.1 kg in 220 l.

Preparatory crops:

Fallow: Weedkillers: Diquat at 0.59 kg ion in 220 l.

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Seed:

Museum blocks:

All-grass ley: Meadow Fescue S215 at 17 kg. Timothy Erecta RvP at 17 kg. Mixture sown at 34 kg.

Clover-grass ley: Meadow Fescue S215 at 18 kg. Timothy Erecta RvP at 15 kg. New Zealand White Clover Huia at 4 kg. Mixture sown at 37 kg.

Lucerne: Vertus, sown at 28 kg.

1-year seeds hay: Italian Ryegrass RvP sown at 25 kg (both sowings).

Potatoes: Pentland Crown.

New Sequences:

Lucerne: Vertus, sown at 28 kg.

Clover-grass leys: Meadow Fescue S215 at 18 kg. Timothy Erecta RvP at 15 kg. New Zealand White Clover Huia at 4 kg. Mixture sown at 37 kg.

Ryegrass: S24, sown at 22 kg.

Oats: Manod, sown at 200 kg.

Barley: Porthos, sown at 160 kg.

Potatoes: Pentland Crown.

Beans: Minden, sown at 210 kg.

Wheat: Flanders, sown at 190 kg.

Cultivations, etc.:-

Museum blocks:

All-grass ley and clover-grass ley: Glyphosate applied: 20 Nov, 1978. Ploughed: 20 Dec. Paraquat applied: 6 June, 1979. N and PK applied, rotary harrowed twice, seed sown: 8 June. MCPA and MCPB applied: 11 July. Topped: 18 July. Cut for yield once: 27 Sept.

Lucerne: Glyphosate applied: 20 Nov, 1978. Ploughed: 20 Dec. Paraquat applied: 6 June, 1979. PK applied, rotary harrowed twice, seed sown: 8 June. 2,4-DB applied: 11 July. Topped: 31 July. Cut for yield once: 15 Nov.

1-year seeds hay: Ploughed: 30 Oct, 1978. Disc harrowed (and, Highfield only, rotary harrowed): 31 Oct. Seed sown: 3 Nov. Crop failed, heavy spring-tine cultivated twice: 17 May, 1979. Paraquat applied: 6 June. N and PK applied, rotary harrowed twice, seed sown: 8 June. MCPA and MCPB applied: 11 July. Topped: 18 July. Cut for yield once: 27 Sept.

Potatoes: Ploughed: 20 Dec, 1978. Disc harrowed: 10 May, 1979. PK applied: 14 May. Test N applied, spike rotary cultivated, seed planted: 16 May. Weedkillers applied: 4 June. Grubbed: 18 June (Highfield) and 20 June (Fosters). Rotary ridged: 22 June. Fungicide applied with insecticide four times: 26 June, 5 July, 20 July and 3 Aug. Fungicide applied alone: 15 Aug and 4 Sept. Haulm pulverized: 14 Sept. BOV applied: 21 Sept. Lifted: 9 Oct.

Reseeded Grass and Old Grass: PK applied: 14 Nov, 1978. NK applied (to all-grass half plots only): 8 Mar, 1979, 14 June and 27 July. Cut three times: 4 June, 23 July and 27 Sept.

New sequence blocks:

1st Treatment Crops:

All crops: Chalk applied (Highfield only): 10 Nov, 1978. Ploughed: 19 Dec. Spring-tine cultivated: 23 Apr, 1979.

Lucerne: PK applied, rotary harrowed twice, seed sown: 8 June. 2,4-DB applied: 11 July. Topped: 31 July. Cut: 19 Nov.

Clover-grass ley: PK applied, rotary harrowed twice, seed sown: 8 June. MCPA and MCPB applied: 11 July. Topped: 18 July. NK applied: 20 July. Cut: 27 Sept.

Ryegrass: NK and PK applied: 7 June. Rotary harrowed twice, seed sown: 8 June. MCPA and MCPB applied: 11 July. Topped: 18 July. Cut: 27 Sept.

Oats and barley: Barley sown: 23 Apr. Oats sown: 27 Apr. Weedkillers applied: 5 June. Fungicide applied (Barley only): 12 June. Barley combine harvested: 1 Sept. Oats combine harvested: 6 Sept.

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2nd Treatment crops:

Lucerne: PK applied: 14 Nov, 1978. Weedkiller applied: 18 Dec. Cut: 12 June, 1979, 26 July, 19 Nov.

Clover-grass ley and ryegrass: PK applied: 14 Nov, 1978. Spring NK applied: 8 Mar, 1979. Cut: 6 June, 26 July, 27 Sept. NK applied, to ryegrass only: 14 June, 27 July.

Potatoes: Ploughed: 18 Dec, 1978. Spring-tine cultivated (Fosters only): 19 Apr, 1979. Spring-tine cultivated: 23 Apr. NPK applied: 14 May. Spike rotary cultivated, seed planted: 16 May. Weedkillers applied: 4 June. Grubbed: 18 June (Highfield), 20 June (Fosters). Rotary ridged: 22 June. Fungicide applied with insecticide: 26 June, 5 July, 20 July, 3 Aug. Fungicide applied: 15 Aug, 4 Sept. Haulm pulverized: 14 Sept. BOV applied: 21 Sept. Lifted: 16 Oct.

Barley: Ploughed: 18 Dec, 1978 (Fosters) 21 Dec, (Highfield). Spring-tine cultivated: 19 Apr, 1979 (Fosters), 23 Apr (Highfield). Seed sown: 23 Apr. Weedkillers applied: 5 June. Fungicide applied: 12 June. Combine harvested: 1 Sept.

3rd Treatment Crops:

Lucerne: PK applied: 14 Nov, 1978. Weedkiller applied: 18 Dec. Cut: 12 June, 27 July. Topped: 17 Aug.

Clover-grass ley and ryegrass: PK applied: 14 Nov, 1978. NK applied: 8 Mar, 1979. Cut: 6 June, 26 July. NK applied (to ryegrass only): 14 June. Topped: 17 Aug.

Beans: Ploughed (Highfield only) Deep tine cultivated (Fosters only): 20 Dec, 1978. Spring-tine cultivated (Fosters only): 19 Apr, 1979. Rotary harrowed, seed sown: 23 Apr. Tractor hoed: 6 June. Insecticide applied: 22 June, 12 July. Combine harvested: 20 Sept.

Wheat: Ploughed: 16 Oct, 1978. Rotary harrowed, seed sown: 17 Oct. N applied: 3 May, 1979. Weedkillers applied: 9 May. Combine harvested: 29 Aug.

Preparatory area:

Fallow: Ploughed: 18 Dec, 1978 (Fosters only), 20 Dec (Highfield). Heavy spring-tine cultivated (Highfield only): 17 May, 1979. Rotary cultivated: 18 May, 12 June, 29 June. Cultivated with thistle bar: 2 Aug. Weedkiller applied: 14 Sept. Spring-tine cultivated: 3 Oct. Deep tine cultivated: 30 Oct.

NOTE: In July wheat and barley on the New Sequence blocks were sampled for take-all and Phialophora.

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MUSEUM BLOCKS

DRY MATTER: TONNES/HECTARE

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

	HIGHFIELD	FOSTERS
CLOVER-GRASS LEY		
1ST AND ONLY CUT	2.16	2.40
MEAN DM%	22.9	15.6
ALL GRASS LEY		
1ST AND ONLY CUT	3.55	2.94
MEAN DM%	20.6	18.6
HAY		
1ST AND ONLY CUT	3.16	2.83
MEAN DM%	20.7	19.5

OLD GRASS

TOTAL OF 3 CUTS

	HIGHFIELD	
	C	N
31ST EXPTL YEAR		
BLOCKS 1 & 4	4.34	9.53
BLOCK 2	4.29	10.45
MEAN DM%	20.3	24.4

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RESEEDED GRASS

TOTAL OF 3 CUTS

		HIGHFIELD			FOSTERS	
	BLOCKS	C	N	BLOCKS	C	N
31ST EXPTL YEAR	1 & 4	4.55	10.05	1 & 3	6.00	10.07
31ST EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	5.49	10.43	2 & 4	5.76	9.02
MEAN DM%		23.6	23.3		19.9	20.8

NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

BARLEY

	HIGHFIELD	FOSTERS
	5.77	5.24
MEAN DM%	83.7	83.9

WHEAT

	HIGHFIELD	FOSTERS
	4.56	5.28
MEAN DM%	85.3	85.7

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79/R/RN/1 HIGHFIELD

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

ROTATION FYMRES68	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
NONE	39.5	44.9	39.0	29.9	38.3
FYM	40.1	44.9	39.0	27.0	37.7
MEAN	39.8	44.9	39.0	28.4	38.0

N 79 FYMRES68	0	80	160	240	MEAN
NONE	32.7	37.1	41.1	42.3	38.3
FYM	29.3	39.3	42.4	40.0	37.7
MEAN	31.0	38.2	41.8	41.1	38.0

N 79 ROTATION	0	80	160	240	MEAN
LUCERNE	36.3	42.3	41.6	39.1	39.8
CLOGRA	40.3	45.3	46.0	47.9	44.9
GRASS	33.6	36.8	42.8	42.7	39.0
ARABLE	13.8	28.4	36.7	34.9	28.4
MEAN	31.0	38.2	41.8	41.1	38.0

FYMRES68	N 79 ROTATION	0	80	160	240
NONE	LUCERNE	38.2	40.4	40.4	39.1
	CLOGRA	39.4	45.6	47.9	46.8
	GRASS	33.4	36.2	43.5	42.9
	ARABLE	19.9	26.3	32.7	40.6
FYM	LUCERNE	34.5	44.3	42.7	39.0
	CLOGRA	41.2	45.0	44.2	49.1
	GRASS	33.8	37.4	42.2	42.5
	ARABLE	7.7	30.5	40.6	29.2

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79/R/RN/1 HIGHFIELD

POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES68					
NONE	95.8	96.2	96.3	94.4	95.7
FYM	95.7	96.4	95.6	89.8	94.4
MEAN	95.8	96.3	96.0	92.1	95.0

N 79	0	80	160	240	MEAN
FYMRES68					
NONE	95.6	95.4	95.8	95.8	95.7
FYM	90.6	95.7	96.3	94.9	94.4
MEAN	93.1	95.5	96.1	95.3	95.0

N 79	0	80	160	240	MEAN
ROTATION					
LUCERNE	96.1	95.7	96.3	94.9	95.8
CLOGRA	95.9	96.5	96.3	96.3	96.3
GRASS	96.5	95.5	96.2	95.6	96.0
ARABLE	84.0	94.4	95.5	94.6	92.1
MEAN	93.1	95.5	96.1	95.3	95.0

	N 79	0	80	160	240
FYMRES68	ROTATION				
NONE	LUCERNE	95.5	96.5	95.6	95.5
	CLOGRA	96.7	95.8	95.8	96.4
	GRASS	96.8	95.5	97.7	95.2
	ARABLE	93.4	93.8	94.3	96.2
FYM	LUCERNE	96.6	95.0	97.1	94.3
	CLOGRA	95.1	97.3	96.8	96.2
	GRASS	96.2	95.6	94.7	96.0
	ARABLE	74.5	95.0	96.7	93.0

PLOT AREA HARVESTED 0.00353

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79/R/RN/2 FOSTERS

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES68					
NONE	34.8	36.2	31.8	26.9	32.4
FYM	36.4	37.3	34.5	29.9	34.5
MEAN	35.6	36.8	33.1	28.4	33.5

N 79	0	80	160	240	MEAN
FYMRES68					
NONE	26.4	35.0	32.7	35.5	32.4
FYM	29.2	35.6	38.0	35.2	34.5
MEAN	27.8	35.3	35.4	35.3	33.5

N 79	0	80	160	240	MEAN
ROTATION					
LUCERNE	31.5	37.7	35.4	37.6	35.6
CLOGRA	33.9	38.5	37.9	36.8	36.8
GRASS	27.5	36.3	35.7	33.1	33.1
ARABLE	18.5	28.7	32.5	33.8	28.4
MEAN	27.8	35.3	35.4	35.3	33.5

	N 79	0	80	160	240
FYMRES68	ROTATION				
NONE	LUCERNE	30.5	36.7	34.2	37.7
	CLOGRA	33.7	38.9	35.1	37.0
	GRASS	25.6	36.3	31.6	33.6
	ARABLE	15.8	28.2	30.0	33.6
FYM	LUCERNE	32.5	38.8	36.7	37.5
	CLOGRA	34.0	38.0	40.6	36.7
	GRASS	29.3	36.2	39.8	32.6
	ARABLE	21.1	29.3	35.1	34.1

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79/R/RN/2 FOSTERS

POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES68					
NONE	95.2	95.4	95.3	94.6	95.1
FYM	95.2	94.3	95.3	94.4	94.8
MEAN	95.2	94.8	95.3	94.5	95.0

N 79	0	80	160	240	MEAN
FYMRES68					
NONE	95.1	94.9	95.4	95.0	95.1
FYM	94.1	95.4	94.8	94.9	94.8
MEAN	94.6	95.1	95.1	95.0	95.0

N 79	0	80	160	240	MEAN
ROTATION					
LUCERNE	94.9	94.9	95.4	95.7	95.2
CLOGRA	94.5	95.2	95.2	94.5	94.8
GRASS	95.1	96.0	95.4	94.7	95.3
ARABLE	93.9	94.4	94.5	95.1	94.5
MEAN	94.6	95.1	95.1	95.0	95.0

	N 79	0	80	160	240
FYMRES68	ROTATION				
NONE	LUCERNE	94.4	94.7	95.5	96.3
	CLOGRA	95.9	94.8	96.5	94.3
	GRASS	95.4	96.0	95.4	94.6
	ARABLE	94.7	94.3	94.4	94.9
FYM	LUCERNE	95.4	95.1	95.3	95.0
	CLOGRA	93.1	95.7	93.8	94.6
	GRASS	94.8	96.1	95.5	94.7
	ARABLE	93.0	94.5	94.7	95.4

PLOT AREA HARVESTED 0.00353

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79/W/RN/3

LEY/ARABLE

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

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

The 42nd year, leys, barley, oats, wheat.

For previous years see 'Details' 1967 & 1973 and 74-78/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:

LN	(Previous LEY) LN, LN, LN, W, B
LC	(Previous CLO) LC, LC, LC, W, B
AF	(Previous A) F, F, O, W, B
AB	(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:

ALT LN	LN, LN, LN, LN, LN, LN, LN, LN, W, B
ALT LC	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). Initially some of the long term leys are ploughed up in less than eight years, depending on the starting point in relation to the test crop, to ensure that ultimately eight-year leys will be available for each test crop period.

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79/W/RN/3

Treatments to first test crop wheat and second test crop barley (yields are taken only from the test crops):

ROT CYCL — Combinations of rotations and cycles defined above (all leys ploughed after three years)

LN
LC
AF
AB
ALT LN
ALT LC

Additional treatments to first test crop, wheat:-

1/2 plots

1. FYMRES63 — Farmyard manure residues, last applied 1963:

   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. FYMRES62 — Farmyard manure residues, last applied 1962:

   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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79/W/RN/3

Corrective K dressings (kg K_2O) as muriate of potash, applied to first test crop wheat and long-term leys in the wheat block:

Continuous rotations	No FYM half plots	FYM half plots
LN	289	251
LC	63	0
AF	238	188
AB	188	201
Ex-alternating rotations		
ALT LN ploughed for wheat	226	100
ALT LN not ploughed	138	213
ALT LC ploughed for wheat	138	0
ALT LC not ploughed	0	0

Standard applications:-

Grass ley and Clover/grass ley, 1st year: Manures: (0:14:28) at 540 kg. N at 75 kg as 'Nitro-chalk' to grass ley only.

Grass ley, 2nd, 3rd, 4th, 5th, 6th and 7th years: Manures: Magnesian limestone at 5 t to 5th year only. (0:14:28) at 540 kg. (25:0:16) at 300 kg in spring and after the first cut.

Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th and 7th years: Manures: Magnesian limestone at 5 t to 5th year only. (0:14:28) at 540 kg. K_2O at 48 kg in spring and after the first cut.

Barley, 1st and 2nd treatment crops: Manures: (20:14:14) at 400 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil ('Oxytril CM' at 2.1 kg) in 250 l.

2nd test crop: Manures: Magnesian limestone at 5 t. (0:20:20) at 300 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil ('Oxytril CM' at 2.1 kg) in 250 l. Nematicide: Aldicarb at 10 kg.

Oats: Manures: (20:14:14) at 400 kg, combine drilled. Weedkillers: ('Oxytril CM' at 2.1 kg) in 250 l.

Winter wheat: 1st test crop: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg) in 250 l. Nematicide: Aldicarb at 10 kg.

Varieties: Grass ley: Erecta timothy 17 kg, Meadow fescue S.215 17 kg, sown at 34 kg.
Clover/grass ley: Erecta timothy 20 kg, Meadow fescue S.215 16 kg, Huia white clover 4 kg, sown at 40 kg.
Barley: Porthos, dressed with ethirimol, sown at 160 kg.
Oats: Manod, sown at 200 kg.
Winter wheat: Flanders, sown at 180 kg.

Cultivations, etc.- Treatment crops:

Grass ley and clover/grass ley, 1st year: Ploughed: 21 Nov, 1978. Spring-tine cultivated with crumbler attached: 17 Apr, 1979. PK applied, N applied to grass ley only: 11 May. Rotary cultivated, seeds sown: 4 June. Cut: 4 Sept.

Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th and 7th years: Magnesian limestone applied to 5th year only: 9 Oct, 1978. Corrective K applied to 4th year only: 9 Nov. PK applied: 26 Feb, 1979. NK applied to grass ley, K applied to clover/grass ley: 30 Apr, 5 July. Cut: 19 June, 4 Sept.

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Barley: 1st and 2nd treatment crops: Ploughed: 21 Nov, 1978. Spring-tine cultivated with crumbler attached twice: 17 Apr, 1979, 21 Apr. Seed sown: 23 Apr. Weedkiller applied: 5 June. Combine harvested: 29 Aug.
Oats: 3rd treatment crop: Ploughed: 21 Nov, 1978. Spring-tine cultivated with crumbler attached twice: 17 Apr, 1979, 21 Apr. Seed sown: 23 Apr. Weedkiller applied: 5 June. Combine harvested: 6 Sept.
Fallow: 1st and 2nd treatment year: Ploughed: 21 Nov, 1978. Spring-tine cultivated with crumbler attached: 17 Apr, 1979. Spring-tine cultivated with crumbler attached 2nd year only: 21 Apr. Rotary cultivated 2nd year only: 11 June. Spring-tine cultivated 1st year only: 12 June. Deep-tine cultivated twice: 12 July, 21 Aug.
Test Crops:
Winter wheat, 1st test crop: Rotary cultivated and ploughed: 8 Nov, 1978. Corrective K applied, aldicarb applied, rotary cultivated, spring-tine cultivated, seed sown: 9 Nov. N applied: 17 Apr, 1979. Weedkiller applied: 15 May. Combine harvested: 30 Aug.
Barley, 2nd test crop: Magnesian limestone applied: 9 Oct, 1978. Ploughed: 21 Nov. Spring-tine cultivated with crumbler attached twice: 17 Apr, 1979, 21 Apr. Aldicarb applied, rotary cultivated, seed sown, N applied: 3 May. Weedkiller applied: 5 June. Combine harvested: 28 Aug.

79/W/RN/3 2ND TEST CROP BARLEY

GRAIN TONNES/HECTARE

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

ROT CYCL	LN	LC	AF	AB	ALT LN	ALT LC	MEAN
FYMRES62							
NONE	5.78	5.32	4.86	4.44	4.81	5.53	5.12
FYM	5.09	5.35	4.81	4.57	5.08	5.64	5.09
N							
0	3.69	3.23	2.43	2.57	2.98	3.48	3.06
50	6.15	5.22	4.69	3.96	5.08	6.02	5.19
100	5.86	6.09	5.95	5.37	5.65	6.42	5.89
150	6.05	6.82	6.28	6.12	6.06	6.41	6.29
MEAN	5.44	5.34	4.83	4.51	4.94	5.59	5.11

ROT CYCL	N	LN	LC	AF	AB	ALT LN	ALT LC
FYMRES62							
NONE	0	3.88	3.27	2.40	2.54	2.98	3.49
	50	6.40	5.03	4.91	3.74	4.79	6.04
	100	6.37	5.83	5.91	5.02	5.70	6.25
	150	6.49	7.17	6.21	6.44	5.78	6.34
FYM	0	3.50	3.19	2.45	2.61	2.98	3.47
	50	5.91	5.41	4.47	4.17	5.38	6.01
	100	5.34	6.34	5.99	5.73	5.60	6.60
	150	5.61	6.48	6.34	5.79	6.34	6.49

GRAIN MEAN DM% 83.3

PLOT AREA HARVESTED 0.00260

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79/W/RN/3 1ST TEST CROP WINTER WHEAT

GRAIN TONNES/HECTARE

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

ROT CYCL	LN	LC	AF	AB	ALT LN	ALT LC	MEAN
FYMRES63							
NONE	3.10	3.89	3.92	2.74	2.72	4.43	3.47
FYM	3.13	4.21	4.16	2.74	2.78	4.59	3.60
N							
0	1.68	3.38	0.78	1.03	1.41	3.61	1.98
63	3.18	4.34	4.27	3.02	2.62	4.80	3.71
126	3.88	4.46	5.69	3.45	3.54	4.97	4.33
189	3.74	4.03	5.41	3.47	3.43	4.67	4.12
MEAN	3.12	4.05	4.04	2.74	2.75	4.51	3.54

ROT CYCL		LN	LC	AF	AB	ALT LN	ALT LC
FYMRES63	N						
NONE	0	1.79	2.98	0.63	0.78	1.25	3.52
	63	3.12	3.93	3.95	3.03	2.44	4.72
	126	3.93	4.64	5.57	3.36	3.91	4.92
	189	3.56	4.01	5.55	3.79	3.30	4.56
FYM	0	1.56	3.77	0.94	1.29	1.56	3.70
	63	3.24	4.75	4.60	3.00	2.80	4.88
	126	3.83	4.28	5.81	3.55	3.17	5.01
	189	3.91	4.04	5.28	3.14	3.57	4.78

GRAIN MEAN DM% 86.7

STRAW TONNES/HECTARE

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

ROT CYCL	LN	LC	AF	AB	ALT LN	ALT LC	MEAN
FYMRES63							
NONE	4.79	5.32	2.90	1.93	3.50	5.31	3.96
FYM	4.60	5.53	3.12	2.04	3.65	5.35	4.05
N							
0	1.75	3.89	0.58	0.74	1.31	3.70	2.00
63	4.83	5.58	2.45	1.86	3.53	5.30	3.93
126	5.52	5.98	4.29	2.66	4.64	6.01	4.85
189	6.68	6.25	4.69	2.66	4.81	6.32	5.24
MEAN	4.69	5.43	3.01	1.98	3.57	5.33	4.00

ROT CYCL		LN	LC	AF	AB	ALT LN	ALT LC
FYMRES63	N						
NONE	0	1.84	3.89	0.54	0.59	1.20	3.66
	63	5.04	5.40	2.25	1.90	3.39	5.52
	126	5.50	5.58	4.24	2.51	4.91	5.87
	189	6.77	6.40	4.55	2.71	4.49	6.21
FYM	0	1.65	3.89	0.62	0.89	1.43	3.75
	63	4.62	5.76	2.66	1.82	3.67	5.08
	126	5.53	6.39	4.34	2.81	4.38	6.15
	189	6.60	6.10	4.84	2.61	5.13	6.43

STRAW MEAN DM% 83.7 PLOT AREA HARVESTED 0.00260

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79/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 38th year, ryegrass.

For previous years see 'Details' 1967 & 1973 and 74-78/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: 75 kg N in spring and after the first cut.

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

Cultivations, etc.:- Both series.
N applied: 6 Apr, 1979, 5 July. Cut three times: 18 June, 3 Aug, 3 Sept.

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79/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 24th year of the rotation, barley, ley, potatoes, winter wheat, kale.
The 20th year of the same rotation on the additional plots.
The 23rd 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 69-78/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 P_2O_5 as superphosphate

K: 250 kg K_2O as muriate of potash

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

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.

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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: N2 applied as urea.
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. Since 1978 all F plots received in addition 126 kg K20 for potatoes - applied in autumn 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 and mecoprop at 1.3 kg in 280 l. Fungicide: Tridemorph at 0.53 kg with benodanil at 1.1 kg in 280 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.
Potatoes: Fungicide: Mancozeb at 1.3 kg in 280 l applied three times to additional plots and four times to original plots. Insecticides: Pirimicarb at 0.14 kg in 280 l applied twice with the first and second fungicide applications. Menazon at 0.28 kg in 280 l alone to additional plots, with mancozeb to original plots.
Wheat: Ioxynil at 0.32 kg and mecoprop at 0.95 kg in 280 l. Fungicides: Tridemorph at 0.53 kg with benodanil at 1.1 kg in 280 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.
Kale: Pirimicarb at 0.07 kg in 280 l.

Seed: Barley: Minak, sown at 200 kg.
Grass-clover ley: Italian ryegrass RvP, and red clover Hungaropoly.
Potatoes: Pentland Crown.
Winter wheat: Maris Hobbit, sown at 210 kg.
Kale: Thousand Head.

Cultivations, etc.:-
Barley: Dug by hand: 20 Nov, 1978. P, K, Mg, Ca and S applied: 26 Feb, 1979. N applied, rotary cultivated, raked by hand, seed sown: 19 Apr. Weedkillers applied: 25 May. Trace elements applied: 5 June. Fungicides applied: 25 June. Insecticide applied: 16 July. Harvested by hand: 28 Aug.
Grass-clover ley: Rotary cultivated, raked by hand, seed sown: 1 Sept, 1978. P, K, Mg and S applied: 20 Nov. N applied: 23 Mar, 1979. Cut: 31 May, 19 July, 21 Sept.
Potatoes: Dug by hand: 6 Dec, 1978. P, K, Mg, Ca and S applied: 26 Feb, 1979. N applied (first half on additional plots), rotary cultivated, raked by hand, potatoes planted: 8 May. Second half N applied to additional plots: 5 June.

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Trace elements applied: 11 June. Fungicide with pirimicarb applied: 27 June and 16 July. Fungicide with menazon applied to original plots, additional plots not given manures lifted: 2 Aug. Menazon applied to remaining additional plots, original plots given neither K nor FYM, lifted: 3 Aug. Mancozeb applied to remaining plots: 20 Aug. Remaining plots lifted: 24 Sept.

Wheat: P, K and Mg applied: 21 Sept, 1978. Dug by hand: 22 Sept. Raked by hand, seed sown: 29 Sept. Weedkillers applied: 20 Nov. N applied (first half on additional plots): 23 Mar, 1979. Second half N applied to additional plots: 19 Apr. Fungicides applied: 8 May. Insecticide applied: 16 July. Harvested by hand: 14 Aug.

Kale: FYM applied to original plots, all plots dug: 24 Oct, 1978. P, K, Ca, Mg and S applied: 26 Feb, 1979. N applied (first half on additional plots), rotary cultivated, raked by hand, seed sown: 8 May. Second half N applied to additional plots: 5 June. Trace elements applied to additional plots: 11 June. Insecticide applied: 16 July. Harvested by hand: 11 Oct.

Permanent grass: P and K applied: 20 Nov, 1978. FYM applied: 26 Feb, 1979. N applied: 23 Mar, 31 May, 19 July. Cut: 31 May, 19 July, 20 Sept.

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79/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	4.68	4.59	10.5	2.83	2.23	1.64	2.01	1.87	5.52
N1	5.56	5.75	11.3	4.17	3.75	2.22	1.86	1.58	5.67
P	4.70	4.66	15.3	3.37	2.73	1.67	1.95	1.58	5.20
N1P	2.19	4.05	20.9	4.89	4.68	2.45	1.38	1.05	4.89
K	4.37	4.42	7.0	3.14	2.70	2.10	3.14	2.15	7.38
N1K	7.31	6.68	13.9	5.29	4.94	2.73	3.13	2.02	7.89
PK	4.72	5.04	14.8	3.61	3.18	4.00	4.92	4.22	13.15
N1PK	8.44	8.44	30.5	5.72	5.45	4.41	4.68	4.46	13.55
N2PK	9.59	8.95	53.6	6.18	6.74	4.94	4.41	3.76	13.11
D	6.03	5.92	25.7	4.62	3.74	3.74	4.62	4.19	12.54
N1PKD	9.85	9.93	44.0	6.66	6.57	4.91	5.40	5.07	15.38
N2PKD	9.68	10.39	63.6	6.53	7.47	5.13	5.19	4.64	14.96
MEAN DM%	79.4	68.2		83.7	71.8	16.5	25.0	21.6	21.0

	POTATOES: TOTAL TUBERS	PERMANENT GRASS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE					
0	7.8	0.60	0.82	0.68	2.10
N1	13.1	1.77	1.14	1.75	4.66
P	20.0	0.70	0.59	0.63	1.92
N1P	12.5	1.96	1.30	1.86	5.12
K	23.1	0.90	1.01	0.93	2.83
N1K	41.3	2.57	2.08	2.01	6.66
PK	32.7	1.11	1.57	1.26	3.94
N1PK	53.8	2.36	1.91	1.85	6.12
N2PK	60.4	4.39	2.55	2.88	9.82
D	43.4	3.36	1.85	1.45	6.65
N1PKD	61.7	5.06	2.43	2.25	9.74
N2PKD	67.5	2.70	3.97	3.61	10.28
MEAN DM%		21.4	31.7	28.0	27.0

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79/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT: GRAIN	WINTER WHEAT: STRAW	KALE: FRESH WEIGHT	BARLEY: GRAIN	BARLEY: STRAW	POTATOES TOTAL TUBERS
MANURE						
0	4.38	4.61	13.5	1.83	1.70	11.3
F	9.71	9.95	56.7	6.36	7.13	58.6
FMGCA	9.68	10.33	48.0	6.25	6.57	58.0
FMGS	8.55	8.94	53.2	6.97	7.02	59.8
FCAS	9.93	9.71	54.5	5.81	5.40	58.2
FMGCAS	9.31	9.76	53.6	6.49	6.94	58.6
FMGCASTE	8.59	9.73	48.4	6.03	6.36	59.2
MEAN DM%	80.7	73.2		84.4	79.5	

	LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE				
0	2.43	2.55	1.91	6.88
F	3.67	3.34	2.77	9.78
FMGCA	5.05	4.49	4.26	13.80
FMGS	4.56	3.64	3.64	11.83
FCAS	5.06	4.56	4.51	14.13
FMGCAS	5.63	5.10	4.54	15.26
FMGCASTE	4.77	4.82	4.27	13.87
MEAN DM%	17.3	23.8	20.7	20.6

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79/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 20th 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 71-78/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):

   BARLEY/G — Barley

   In arable rotation since 1960:

   BARLEY/A — Barley
   LEY — Ley
   POTATOES — Potatoes
   S BEET — Sugar beet
   OATS — Oats

   Also:

   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 1979 being barley. A new block was sown to permanent grass in 1974.
(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: Insecticide: Phorate at 2 kg as granules. Weedkillers: Ioxynil at 0.32 kg and mecoprop at 0.94 kg in 280 l; ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l, on both occasions with fungicide. Fungicide: Tridemorph at 0.53 kg on two occasions with weedkiller.
Sugar beet: Manures: Boron at 0.92 kg B203 as borax in 1120 l. Insecticide: Pirimicarb at 0.14 kg in 280 l on two occasions.
Barley: Weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l, with fungicide. Fungicide: Tridemorph at 0.53 kg on two occasions the first with weedkiller the second with benodanil. Benodanil at 0.56 kg in 280 l with tridemorph.
Potatoes: Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 280 l. Insecticide: Pirimicarb at 0.14 kg on two occasions, alone in 280 l on the first occasion, with the fungicide on the second occasion. Fungicide: Mancozeb at 1.3 kg in 280 l on two occasions, the first with insecticide.

Seed: Winter oats: Peniarth, sown at 210 kg.
Sugar beet: Klein E, sown at 5.6 kg.
Barley: Julia, sown at 180 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: Plots dug by hand, P, K and balancing Mg applied, raked, phorate applied, raked, seed sown, raked in: 2 Oct, 1978. Weedkillers and fungicide applied: 17 Nov. First half N applied: 27 Mar, 1979. Second half N applied: 23 Apr. Weedkillers and fungicide applied: 9 May. Harvested: 26 July.
Sugar beet: FYM applied, plots dug by hand: 14 Nov, 1978. P and K applied: 27 Feb, 1979. First N applied, Mg applied to half plots, rotary cultivated, seed sown, raked in: 23 Mar. Second N and boron applied: 30 Apr. Singled: 7 June. Insecticide applied twice: 27 June, 16 July. Lifted: 10 Oct.
Barley: Balancing Mg applied: 25 Oct, 1978. Plots dug by hand: 13 Nov. P and K applied: 27 Feb, 1979. First N applied, raked, seed sown, raked in: 5 Apr. Second N, weedkillers and tridemorph applied: 9 May. Tridemorph and benodanil applied: 20 June. Harvested: 16 Aug.
Potatoes: FYM applied, plots dug by hand: 5 Dec, 1978. P and K applied: 27 Feb, 1979. First N applied, rotary cultivated, Mg applied to half plots, raked, potatoes planted and earthed up: 9 May. Second N applied, weedkillers applied: 30 May. Insecticide applied: 27 June. Insecticide and fungicide applied: 16 July. Lifted plots without K, fungicide applied to remainder: 20 Aug. Remaining plots lifted: 1 Oct.

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Grass-clover ley: Barley stubble lightly cultivated, seeds sown, raked in: 15 Aug, 1978. P and K applied: 17 Nov. N applied: 27 Mar, 1979. Cut: 7 June, 23 July, 18 Sept.
Permanent Grass: P and K applied: 17 Nov, 1978. FYM applied: 27 Feb, 1979. N applied in three equal amounts: 27 Mar, 7 June, 23 July. Cut: 7 June, 23 July, 18 Sept.

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

TONNES/HECTARE

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

	BARLEY/G		BARLEY/A		LEY : DRY MATTER			
	GRAIN	STRAW	GRAIN	STRAW	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE								
0	1.67	1.50	1.17	1.13	0.99	1.00	1.06	3.05
N1	2.29	2.89	2.44	2.94	2.69	1.07	1.08	4.84
P	1.73	1.52	1.17	1.18	1.27	0.96	1.13	3.36
N1P	1.85	2.61	2.21	2.88	2.69	0.75	0.53	3.97
K	1.97	1.68	1.45	1.22	2.44	2.91	2.82	8.16
N1K	4.11	3.56	4.08	4.04	2.97	2.19	2.54	7.69
PK	1.84	1.58	1.71	1.46	3.05	2.45	2.68	8.18
N1PK	4.51	4.34	4.44	4.45	4.29	2.64	3.73	10.66
N2PK	5.29	6.03	5.27	6.20	5.09	2.64	2.60	10.33
D	2.82	2.28	2.43	2.10	4.21	3.12	2.46	9.79
N1PKD	5.24	5.26	4.77	4.91	5.21	2.72	2.57	10.51
N2PKD	5.42	6.56	5.69	7.14	6.27	2.43	2.37	11.07
MEAN DM%	81.4	77.9	82.3	79.3	19.5	29.9	22.6	24.0

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79/W/RN/6

TONNES/HECTARE

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

	POTATOES TOTAL TUBERS -	MG	MEAN	S BEET ROOTS WASHED	SUGAR %	TOTAL SUGAR	TOPS
MANURE							
0	8.9	9.6	9.2	12.0	15.7	1.88	10.9
N1	6.8	8.5	7.7	19.8	15.3	3.04	23.6
P	8.9	9.6	9.2	11.3	15.9	1.79	10.4
N1P	10.6	9.6	10.1	17.6	14.9	2.62	18.8
K	18.8	26.0	22.4	11.3	16.4	1.85	10.1
N1K	36.6	38.3	37.4	29.6	17.8	5.27	27.5
PK	22.2	26.7	24.4	14.4	16.5	2.37	11.6
N1PK	44.4	46.1	45.3	34.7	17.7	6.13	33.0
N2PK	40.7	27.7	34.2	35.9	16.5	5.92	39.3
D	39.3	36.9	38.1	28.4	18.3	5.20	19.5
N1PKD	52.3	49.5	50.9	41.7	18.0	7.49	32.3
N2PKD	46.1	44.1	45.1	46.8	17.1	8.01	43.7

	OATS GRAIN	STRAW	PERMGRAS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE						
0	1.48	2.25	2.56	0.88	0.84	4.28
N1	4.13	4.67	3.04	1.20	1.85	6.09
P	1.29	2.04	2.47	1.00	0.71	4.19
N1P	4.28	4.77	3.22	1.16	1.81	6.18
K	1.42	2.41	2.67	0.93	1.19	4.78
N1K	3.95	5.37	3.46	1.67	1.84	6.97
PK	1.62	2.70	3.32	1.21	1.13	5.66
N1PK	3.64	5.21	4.03	1.71	1.79	7.54
N2PK	6.23	9.55	4.82	1.63	1.89	8.34
D	2.27	2.93	3.53	1.18	1.35	6.05
N1PKD	4.75	7.17	2.96	1.78	2.14	6.88
N2PKD	6.23	10.23	4.88	2.41	2.07	9.36
MEAN DM%	71.1	45.1	21.7	35.1	23.7	26.8

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79/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 20th year, ley (Great Field IV): wheat and ley (Sawyers I).

For previous years see 'Details' 1967 and 1973 and 74-78/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 1978):
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 were sown to continuous wheat on Sawyers I, to ley on Great Field IV. In 1978 & 1979 one series was sown to ley each year on Sawyers I.
(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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Standard applications:
Leys: (Great Field IV and Sawyers I: Series III second-year ley): Manures: K_2O at 250 kg as muriate of potash. (Sawyers I: Series II: First-year ley): Manures: Chalk at 2.9 t. N at 60 kg as 'Nitro-Chalk'. K_2O at 250 kg as muriate of potash. Weedkillers: Glyphosate at 1.5 kg in 220 l.
Wheat: (Sawyers I: Series I: Fifth cereal): Manures: K_2O at 90 kg as muriate of potash. N at 125 kg as 'Nitro-Chalk'. Weedkillers: Glyphosate at 1.5 kg in 220 l. Methabenzthiazuron at 3.1 kg in 220 l.

Seed: Ley: (Sawyers I: Series II: First year of ley): Timothy RvP Erecta at 7 kg, Meadow Fescue S215 at 14 kg, New Zealand White Clover Huia at 3 kg, mixture sown at 24 kg.
Wheat: Cappelle, sown at 200 kg.

Cultivations, etc.:-
Leys: (Great Field IV): Standard K applied: 17 Nov, 1978. Test P applied: 6 Mar, 1979. Cut: 6 June, 23 July, 28 Sept.
(Sawyers I: Series III: Second year ley): Standard K applied: 16 Nov, 1978. Test P applied: 6 Mar, 1979. Cut: 6 June, 24 July, 1 Oct.
(Sawyers I: Series II: First year ley): Weedkiller applied: 2 Oct, 1978. Chalk applied: 4 Oct. Ploughed: 26 Oct. Heavy spring-tine cultivated twice: 27 Oct, 17 May, 1979. Standard N and K and test P applied, rotary harrowed, seed sown: 11 June. Cut: 1 Oct.
Wheat: (Sawyers I: Series I: Fifth cereal): Glyphosate applied: 2 Oct, 1978. Ploughed: 26 Oct. Heavy spring-tine cultivated, standard K and test P applied, rotary harrowed, seed sown and methabenzthiazuron applied: 27 Oct. Standard N applied: 23 Apr, 1979. Combine harvested: 31 Aug.

NOTE: Estimates of take-all (Gaeumannomyces graminis) were made on wheat in April and early July.

79/R/RN/7 GREAT FIELD IV

SERIES I LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (6/6/79)	CUT 2 (23/7/79)	CUT 3 (28/9/79)	TOTAL OF 3 CUTS
P_2O_5				
NONE	2.05	3.25	1.47	6.77
29 ANN	1.88	3.02	1.63	6.53
57 ANN	2.31	0.97	2.06	5.34
115 ANN	2.18	2.53	1.70	6.41
172 ANN	2.41	3.31	2.26	7.98
86 TRI	2.74	0.95	2.36	6.05
172 TRI	2.28	3.16	1.85	7.29
344 SIX	2.39	2.55	2.06	6.99
688 SIX	2.17	2.57	2.02	6.76
1032 SIX	2.32	3.12	2.22	7.66
376 G(1)	2.17	3.21	1.38	6.75
376 S(1)	2.52	2.85	1.67	7.04
MEAN	2.28	2.62	1.89	6.80
MEAN DM%	13.5	22.6	22.0	19.4

PLOT AREA HARVESTED 0.00186

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79/R/RN/7 GREAT FIELD IV

SERIES II LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (6/6/79)	CUT 2 (23/7/79)	CUT 3 (28/9/79)	TOTAL OF 3 CUTS
P205				
NONE	2.24	2.95	1.44	6.63
29 ANN	3.19	3.01	1.99	8.19
57 ANN	3.69	3.18	2.12	8.99
115 ANN	3.37	2.80	2.28	8.45
172 ANN	3.38	2.91	2.25	8.55
86 TRI	3.10	3.38	1.85	8.32
172 TRI	3.88	3.13	2.37	9.38
344 SIX	3.35	3.52	1.93	8.80
688 SIX	3.69	2.66	2.16	8.50
1032 SIX	3.51	3.05	2.04	8.60
376 G(1)	2.69	3.51	1.46	7.66
376 S(1)	2.64	3.14	1.58	7.36
MEAN	3.23	3.10	1.96	8.29
MEAN DM%	14.3	22.7	23.5	20.1

PLOT AREA HARVESTED 0.00186

SERIES III LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (6/6/79)	CUT 2 (23/7/79)	CUT 3 (28/9/79)	TOTAL OF 3 CUTS
P205				
NONE	2.23	2.80	1.08	6.12
29 ANN	3.47	3.04	1.73	8.24
57 ANN	3.70	3.50	2.04	9.24
115 ANN	4.23	2.91	1.97	9.12
172 ANN	4.05	2.20	2.58	8.83
86 TRI	3.57	3.11	1.76	8.44
172 TRI	3.90	2.82	2.16	8.88
344 SIX	4.28	3.18	1.83	9.30
688 SIX	3.67	2.94	1.81	8.42
1032 SIX	3.53	2.87	2.27	8.67
376 G(1)	2.64	2.86	1.61	7.11
376 S(1)	2.48	3.30	1.21	6.99
MEAN	3.48	2.96	1.84	8.28
MEAN DM%	14.8	23.0	25.0	20.9

PLOT AREA HARVESTED 0.00186

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79/R/RN/7 SAWYERS I

SERIES II LEY

1ST CUT (1/10/79) DRY MATTER TONNES/HECTARE

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

P205	
NONE	1.20
29 ANN	2.20
57 ANN	2.57
115 ANN	2.91
172 ANN	2.67
86 TRI	2.11
172 TRI	2.35
344 SIX	2.40
688 SIX	2.37
1032 SIX	2.45
376 G(1)	1.20
376 S(1)	1.91
MEAN	2.20
SED*	0.276
CV%	12.6
MEAN DM%	20.4

* NOTE STRATUM STANDARD ERROR (11 df) is also equal to this figure

PLOT AREA HARVESTED 0.00204

SERIES III LEY

DRY MATTER TONNES/HECTARE

P205	CUT 1 (6/6/79)	CUT 2 (25/7/79)	CUT 3 (1/10/79)	TOTAL OF 3 CUTS
NONE	3.47	1.83	1.30	6.60
29 ANN	3.13	1.67	1.63	6.43
57 ANN	3.12	2.25	1.87	7.25
115 ANN	3.55	2.47	2.02	8.04
172 ANN	3.74	2.64	2.27	8.64
86 TRI	2.86	1.75	1.61	6.22
172 TRI	3.16	2.45	1.96	7.57
344 SIX	2.96	1.88	1.64	6.48
688 SIX	2.99	1.60	1.67	6.27
1032 SIX	3.67	2.32	2.02	8.02
376 G(1)	4.04	1.72	1.39	7.16
376 S(1)	3.51	1.73	1.38	6.63
MEAN	3.35	2.03	1.73	7.11
SED*	0.203	0.262	0.118	0.345
CV%	6.0	12.9	6.8	4.9
MEAN DM%	17.1	24.8	25.5	22.5

PLOT AREA HARVESTED 0.00204

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78/R/RN/7 SAWYERS I

SERIES III LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (1/9/78)	CUT 2 (30/10/78)	TOTAL OF 2 CUTS
SED*	0.171	0.132	0.237
CV%	8.6	27.2	9.6

79/R/RN/7 SAWYERS I

SERIES I 5TH CEREAL WHEAT

TONNES/HECTARE

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

P205	GRAIN	STRAW
NONE	4.39	4.26
29 ANN	5.12	4.89
57 ANN	5.10	4.93
115 ANN	5.28	4.84
172 ANN	5.37	4.89
86 TRI	4.91	4.54
172 TRI	5.13	4.95
344 SIX	4.72	4.42
688 SIX	5.51	5.33
1032 SIX	5.47	4.98
376 G(1)	4.52	4.21
376 S(1)	4.16	3.89
MEAN	4.97	4.68
SED*	0.356	
CV%	7.2	
MEAN DM%	85.6	90.4

PLOT AREA HARVESTED 0.00562

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79/R/RN/8

CULTIVATION/WEEDKILLER

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

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

The 19th year, barley.

For previous years see 'Details' 1967 and 1973 and 74-78/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: 27 Nov, 1978
	ROTAVATE	Rotary cultivated by rotary digger: 28 Nov
	DEEPTINE	Deep-tine cultivated twice: 27 Nov
2.	WEEDCNTL(76)	Weed control to beans and potatoes in the rotation beans, wheat, potatoes, barley practised until 1976. Last applied to beans 1976:
	MECHANCL	Mechanical
	RESIDUAL	Residual weedkiller (duplicated)

Sub plots

3.	WEEDKLLR(75)	Hormone weedkiller to cereals in the previous rotation, last applied to barley 1975 (basal hormone weedkiller to spring wheat 1977 and barley 1978 and 1979):
	NONE	
	HORMONE	
4.	WEEDKLLR(79)	Paraquat weedkiller to cereal stubbles: 23 Oct, 1978
	NONE	
	PARAQUAT	

NOTE: The combinations of 3 and 4 are tested on half plots: WEEDKLLR(75) NONE, WEEDKLLR(79) NONE and WEEDKLLR(75) HORMONE, WEEDKLLR(79) PARAQUAT on one block, remaining combinations on the other.

EXTRA	plus three extra whole plot treatments:
SPNGTINE	Heavy spring-tine cultivated twice: 27 Nov, 1978. Given simazine to beans 1976, with sub plot tests 3 and 4 above.
(SH)PLGH	Shallow ploughed: 27 Nov, 1978. Given simazine to beans 1976 and paraquat to cereal stubbles with sub plot test 3 above.

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79/R/RN/8

STANDARD — Standard cultivations as considered best for each crop. Ploughed 27 Nov, 1978. Given simazine to beans 1976, with sub plot tests 3 and 4 above.

NOTE: Paraquat was applied at 0.56 kg ion in 220 l.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) and mecoprop at 1.7 kg in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.

Seed: Porthos, sown at 160 kg.

Cultivations, etc.:- Spring-tine cultivated twice, seed sown: 19 Apr, 1979. Weedkillers applied: 4 June. Fungicide applied: 12 June. Combine harvested: 26 Aug.

EXTRA PLOTS ONLY

GRAIN TONNES/HECTARE

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

	EXTRA	SPNGTINE	(SH)PLGH	STANDARD
WEEDKLLR(75)				
	NONE	4.90	4.89	4.78
	HORMONE	5.18	5.06	4.74
WEEDKLLR(79)				
	NONE	5.01		4.44
	PARAQUAT	5.08	4.98	5.08
	MEAN	5.04	4.98	4.76

GRAIN MEAN DM% 82.7

SUB PLOT AREA HARVESTED 0.00434

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79/R/RN/8

OMITTING EXTRA PLOTS

GRAIN TONNES/HECTARE

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

CULTIVTN	PLOUGH	ROTAVATE	DEEPTINE	MEAN
WEEDCNTL(76)				
MECHANCL	4.80	4.67	4.61	4.70
RESIDUAL	5.04	4.64	4.68	4.79
WEEDKLLR(75)				
NONE	5.03	4.63	4.74	4.80
HORMONE	4.88	4.67	4.58	4.71
WEEDKLLR(79)				
NONE	5.03	4.61	4.62	4.75
PARAQUAT	4.89	4.69	4.70	4.76
MEAN	4.96	4.65	4.66	4.76

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

TABLE	CULTIVTN	WEEDCNTL(76)	WEEDKLLR(75)	WEEDKLLR(79)
SED	0.181	0.156	0.082	0.082

TABLE	CULTIVTN	CULTIVTN	CULTIVTN	
	WEEDCNTL(76)	WEEDKLLR(75)	WEEDKLLR(79)	
SED	0.313			MIN REP
	0.271	0.206	0.206	MAX-MIN
	0.221			MAX REP
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CULTIVTN		0.141	0.141	

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

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.313	6.6
BLOCK.WP.SP	10	0.245	5.1

GRAIN MEAN DM% 82.8

SUB PLOT AREA HARVESTED 0.00434

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79/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 15th year, winter wheat, sugar beet, ley.

For previous years see 'Details' 1973 and 74-78/W/RN/12.

Design for winter wheat: 2 blocks of 8 plots split into 8
sugar beet: 2 blocks of 6 plots split into 8
ley: 2 blocks of 2 plots.

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	Clover/grass ley, no N
GRASSLEY	Grass ley with N for each cut

In the sugar beet blocks treatments PEAT & GREENMNR were sown to clover/grass ley in 1979. (No yields obtained in 1979).

Sub plots

2. N — Fertiliser nitrogen (kg N):

WHEAT	SUGAR BEET
0	0
30	40
60	80
90	120
120	160
150	200
180	240
210	280

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79/W/RN/12

Standard applications:
Winter wheat: Manures: P_2O_5 at 110 kg as superphosphate, K_2O at 60 kg as muriate of potash. Weedkiller: Methabenzthiazuron at 1.5 kg in 220 l.
Sugar beet: Manures: Chalk at 5 t, (0:20:20) at 1210 kg in autumn, (0:20:20) at 605 kg in spring. Mg at 60 kg as kieserite. Boron at 8.0 kg B_2O_3 (as 'Solubor') applied with the insecticide. Insecticide: Pirimicarb at 0.14 kg in 250 l.
Clover/grass ley: Manures: Chalk at 5 t, (0:20:20) at 1210 kg in autumn, (0:20:20) at 605 kg in spring, Mg at 60 kg as kieserite.

Seed: Winter wheat: Flanders, sown at 180 kg.
Sugar beet: Klein E, sown at 5.6 kg.
Clover/grass ley: sown at 22.4 kg.

Cultivations, etc.:-
Winter wheat: Heavy spring-tine cultivated, P and K applied, spring-tine cultivated with crumbler attached: 13 Oct, 1978. Seed sown: 14 Oct. Weedkiller applied: 18 Oct. N applied: 18 Apr, 1979. Combine harvested: 29 Aug.
Sugar beet: Chalk applied: 7 Nov, 1978. Autumn PK applied: 24 Nov. Spring PK and Mg applied, spring-tine cultivated: 30 Apr, 1979. Spring-tine cultivated with crumbler attached, seed sown: 1 May. N applied: 4 May. Singled: 11-15 June. Tractor hoed three times: 18 June, 2 July, 16 July. Boron and insecticide applied: 30 June. Lifted: 1 Nov.
Clover/grass ley: Chalk applied: 7 Nov, 1978. Autumn PK applied: 24 Nov. Spring PK and Mg applied, spring-tine cultivated: 30 Apr, 1979. Spring-tine cultivated with crumbler attached: 1 May. N applied: 4 May. Spring-tine cultivated with crumbler attached, seeds sown: 4 June. Topped: 30 July.

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79/W/RN/12 WHEAT

GRAIN TONNES/HECTARE

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

N / MANURE	0	30	60	90	120	150	180	210	MEAN
FYM	1.82	3.82	5.77	6.06	6.88	5.64	6.18	5.89	5.26
STRAW	1.72	3.90	5.48	6.68	6.42	6.58	6.48	6.00	5.41
PEAT	1.38	3.83	5.52	6.42	6.50	7.13	5.89	6.21	5.36
GREENMNR	1.63	3.58	5.16	5.81	4.99	4.76	5.87	5.08	4.61
FERT-FYM	1.16	3.45	4.73	5.83	5.01	4.76	4.44	4.71	4.26
FERT-STR	1.81	3.69	5.44	6.49	6.87	6.33	5.99	5.81	5.30
CLOVRLEY	2.29	4.28	6.11	6.55	6.98	6.17	6.17	6.13	5.59
GRASSLEY	1.57	3.60	5.19	6.52	6.25	5.79	6.52	6.29	5.22
MEAN	1.67	3.77	5.42	6.29	6.24	5.90	5.94	5.77	5.13

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

TABLE	MANURE	N	MANURE N
SED	0.679	0.151	0.787
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.427

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.679	13.2
BLOCK.WP.SP	56	0.427	8.3

GRAIN MEAN DM% 84.7

STRAW TONNES/HECTARE

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

N / MANURE	0	30	60	90	120	150	180	210	MEAN
FYM	1.52	2.96	4.27	5.38	4.78	5.40	5.82	6.75	4.61
STRAW	1.62	3.51	5.15	6.15	6.15	6.66	7.10	6.93	5.41
PEAT	1.14	2.57	3.53	5.30	5.86	4.98	6.34	5.70	4.43
GREENMNR	1.36	3.10	4.23	5.02	4.85	4.79	5.48	5.79	4.33
FERT-FYM	1.17	3.10	4.17	4.89	5.40	5.72	5.39	5.32	4.40
FERT-STR	1.54	3.10	4.79	5.29	6.39	5.76	6.33	6.36	4.95
CLOVRLEY	1.66	3.60	5.29	6.27	6.61	7.04	6.77	7.34	5.57
GRASSLEY	1.31	2.79	4.31	4.97	5.92	5.72	6.27	6.53	4.73
MEAN	1.42	3.09	4.47	5.41	5.74	5.76	6.19	6.34	4.80

STRAW MEAN DM% 90.2

SUB PLOT AREA HARVESTED 0.00173

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79/W/RN/12 SUGAR BEET

ROOTS WASHED TONNES/HECTARE

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

N	0	40	80	120	160	200	240	280	MEAN
MANURE									
FYM	14.2	25.1	29.6	32.4	33.4	30.6	29.2	32.3	28.4
STRAW	13.1	24.9	30.1	37.6	36.8	32.3	34.6	30.8	30.0
FERT-FYM	8.6	21.4	27.2	29.0	31.1	33.7	27.5	25.7	25.5
FERT-STR	10.1	20.6	29.9	31.7	35.9	34.4	28.2	22.3	26.6
CLOVRLEY	12.3	25.4	34.4	34.4	31.3	32.8	28.8	32.9	29.0
GRASSLEY	16.3	28.3	37.7	40.6	42.5	39.8	39.0	39.7	35.5
MEAN	12.4	24.3	31.5	34.3	35.2	33.9	31.2	30.6	29.2

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

TABLE	MANURE	N	MANURE N
SED	3.11	1.58	4.78
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			3.88

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	3.11	10.7
BLOCK.WP.SP	42	3.88	13.3

SUGAR PERCENTAGE

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

N	0	40	80	120	160	200	240	280	MEAN
MANURE									
FYM	18.0	18.2	18.4	17.7	16.9	16.8	16.4	15.9	17.3
STRAW	17.7	18.0	17.7	17.4	18.1	16.5	16.1	15.8	17.2
FERT-FYM	17.2	18.0	18.1	17.8	17.1	16.6	16.4	16.2	17.2
FERT-STR	17.3	18.1	18.2	17.4	17.5	16.7	16.0	15.9	17.2
CLOVRLEY	17.6	17.8	17.7	17.2	17.1	16.8	16.0	15.8	17.0
GRASSLEY	17.8	18.0	18.4	17.9	17.7	16.8	16.5	16.0	17.4
MEAN	17.6	18.0	18.1	17.6	17.4	16.7	16.2	16.0	17.2

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79/W/RN/12 SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

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

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	2.57	4.58	5.44	5.74	5.64	5.16	4.81	5.13	4.89
STRAW	2.31	4.49	5.32	6.57	6.67	5.32	5.58	4.87	5.14
FERT-FYM	1.48	3.84	4.93	5.17	5.31	5.58	4.51	4.16	4.37
FERT-STR	1.76	3.73	5.45	5.51	6.29	5.76	4.56	3.56	4.58
CLOVRLEY	2.16	4.53	6.11	5.94	5.35	5.49	4.61	5.19	4.92
GRASSLEY	2.91	5.09	6.90	7.24	7.51	6.71	6.46	6.36	6.15
MEAN	2.20	4.38	5.69	6.03	6.13	5.67	5.09	4.88	5.01

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

TABLE	MANURE	N	MANURE N
SED	0.540	0.282	0.842
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.690

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.540	10.8
BLOCK.WP.SP	42	0.690	13.8

TOPS TONNES/HECTARE

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

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	10.1	14.5	19.5	28.8	31.7	33.5	33.8	38.7	26.3
STRAW	8.4	19.4	21.4	30.5	33.5	39.1	42.4	33.8	28.5
FERT-FYM	5.8	12.4	19.4	23.4	29.6	35.6	28.9	28.2	22.9
FERT-STR	7.5	12.2	21.1	24.8	31.7	35.4	30.2	29.1	24.0
CLOVRLEY	8.9	16.2	25.5	29.5	29.8	35.4	36.6	35.6	27.2
GRASSLEY	11.7	19.2	29.5	36.3	37.8	40.8	42.9	45.3	32.9
MEAN	8.7	15.6	22.7	28.9	32.4	36.6	35.8	35.1	27.0

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

TABLE	MANURE	N	MANURE N
SED	2.85	1.34	4.18
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			3.27

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	2.85	10.6
BLOCK.WP.SP	42	3.27	12.1

SUB PLOT AREA HARVESTED 0.00130

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79/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 14th year, winter wheat, barley.

For previous years see 'Details' 1973 and 74-78/W/RN/13.

Design: For each experiment: 2 randomised blocks of 6 plots, split into 4. DAZOMET 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. DAZOMET — Dazomet (cumulative to a test of none and aldicarb in 1977 & 1978) applied in autumn (kg):

0
336

Whole plots

2. PREVCROP — Previous crops:

	1972	1973	1974	1975	1976	1977	1978
P C2	C	C	C	L	P	C	C
P C3	C	C	L	P	C	C	C
P C4	C	L	P	C	C	C	C
P C5	L	P	C	C	C	C	C
L C2	P	C	C	C	L	C	C
C13	C	C	C	C	C	C	C

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

Sub plots

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

Wheat	Barley	Wheat Autumn + Spring	Barley Spring
0 + 63	50	0 + 63	50
0 + 126	100	0 + 126	100
0 + 189	150	0 + 189	150
63 + 189	200	63 + 189	200

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Standard applications:
Wheat: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Methabenzthiazuron at 1.5 kg in 220 l.
Barley: Manures: (0:20:20) at 300 kg, combine drilled. Weedkillers: Bromoxynil with ioxynil ('Oxytril CM' at 2.1 kg in 250 l).

Seed: Wheat: Flanders, sown at 180 kg.
Barley: Porthos, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
All plots: Ploughed: 30 Aug, 1978. Spring-tine cultivated, with crumbler attached: 31 Aug. Dazomet applied and all plots rotary cultivated: 7 Sept.
Wheat: Rotary cultivated: 11 Oct, 1978. Seed sown: 13 Oct. Autumn N and weedkiller applied: 18 Oct. Spring N applied: 10 Apr, 1979. Combine harvested: 30 Aug.
Barley: Heavy spring-tine cultivated: 16 Oct, 1978. Spring-tine cultivated, with crumbler attached, twice: 16 Apr, 1979, 20 Apr. Seed sown: 23 Apr. N applied: 30 Apr. Weedkiller applied: 5 June. Combine harvested: 28 Aug.

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79/W/RN/13

WINTER WHEAT

GRAIN TONNES/HECTARE

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

PREVCROP / DAZOMET	P C2	P C3	P C4	P C5	L C2	C13	MEAN
0	4.38	4.37	4.15	4.76	3.96	4.64	4.38
336	5.19	5.15	4.94	5.23	4.64	4.91	5.01
MEAN	4.79	4.76	4.54	5.00	4.30	4.77	4.69

N / DAZOMET	0+63	0+126	0+189	63+189	MEAN
0	3.50	4.61	4.80	4.60	4.38
336	4.96	5.67	4.95	4.47	5.01
MEAN	4.23	5.14	4.87	4.54	4.69

N / PREVCROP	0+63	0+126	0+189	63+189	MEAN
P C2	4.00	5.37	4.82	4.96	4.79
P C3	4.25	5.15	5.08	4.56	4.76
P C4	4.17	4.87	4.58	4.55	4.54
P C5	4.47	5.56	5.29	4.68	5.00
L C2	3.80	4.86	4.31	4.23	4.30
C13	4.68	5.01	5.16	4.24	4.77
MEAN	4.23	5.14	4.87	4.54	4.69

N / DAZOMET / PREVCROP	0+63	0+126	0+189	63+189
0 P C2	3.25	4.69	4.69	4.91
P C3	3.36	4.87	4.55	4.69
P C4	3.38	3.97	4.64	4.61
P C5	3.82	5.18	5.23	4.84
L C2	2.92	4.19	4.43	4.32
C13	4.26	4.75	5.27	4.27
336 P C2	4.74	6.06	4.96	5.02
P C3	5.14	5.42	5.61	4.43
P C4	4.97	5.76	4.53	4.48
P C5	5.13	5.93	5.35	4.53
L C2	4.68	5.54	4.20	4.14
C13	5.10	5.27	5.04	4.21

GRAIN MEAN DM% 86.4

SUB PLOT AREA HARVESTED 0.00277

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79/W/RN/13

BARLEY

GRAIN TONNES/HECTARE

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

PREVCROP / DAZOMET	P C2	P C3	P C4	P C5	L C2	C13	MEAN
0	4.52	4.28	4.72	4.28	4.42	4.03	4.38
336	4.96	4.99	5.06	4.71	4.70	4.86	4.88
MEAN	4.74	4.63	4.89	4.50	4.56	4.44	4.63

N / DAZOMET	50	100	150	200	MEAN
0	2.61	4.26	5.26	5.37	4.38
336	3.84	5.15	5.23	5.29	4.88
MEAN	3.22	4.71	5.25	5.33	4.63

N / PREVCROP	50	100	150	200	MEAN
P C2	3.10	4.88	5.35	5.64	4.74
P C3	3.28	4.83	5.11	5.31	4.63
P C4	3.66	4.94	5.44	5.51	4.89
P C5	2.90	4.63	5.24	5.22	4.50
L C2	3.34	4.43	5.18	5.28	4.56
C13	3.06	4.52	5.16	5.03	4.44
MEAN	3.22	4.71	5.25	5.33	4.63

DAZOMET / N / PREVCROP	50	100	150	200
0 P C2	2.29	4.52	5.58	5.70
P C3	2.52	4.41	5.02	5.18
P C4	3.34	4.53	5.37	5.64
P C5	2.03	4.36	5.30	5.44
L C2	3.09	3.85	5.37	5.38
C13	2.37	3.93	4.92	4.89
336 P C2	3.90	5.25	5.12	5.58
P C3	4.05	5.25	5.20	5.44
P C4	3.97	5.36	5.52	5.38
P C5	3.78	4.90	5.18	5.00
L C2	3.59	5.02	5.00	5.18
C13	3.75	5.12	5.40	5.17

GRAIN MEAN DM% 85.3

SUB PLOT AREA HARVESTED 0.00277

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79/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 12th 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 73-78/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: K20 at 240 kg as muriate of potash. MgO at 30 kg as Epsom Salts in winter. K20 at 48 kg as muriate of potash after the first cut.

Cultivations, etc.:- K and Mg applied: 6 Feb, 1979. Cut twice: 21 June, 7 Sept. K applied: 5 July.

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79/W/RN/14

1ST CUT (21/6/79) DRY MATTER TONNES/HECTARE

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

P205RES(73) / P205RES(72)	0	360	720	1440	2160	MEAN
0	4.94	5.21	4.90	6.06	4.92	5.16
376	5.10	5.27	4.84	5.30	4.42	5.01
MEAN	5.02	5.24	4.87	5.68	4.67	5.08

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

TABLE	P205RES(73)	P205RES(72)	P205RES(73) P205RES(72)	
SED	0.328		0.368	MIN REP
	0.284	0.096	0.319	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.235	MIN REP
			0.167	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	0.568	11.2
BLOCK.WP.SP	31	0.408	8.0

1ST CUT MEAN DM% 20.3

1ST CUT PLOT AREA HARVESTED 0.00145

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79/W/RN/14

2ND CUT (7/9/79) DRY MATTER TONNES/HECTARE

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

P205RES(73) / P205RES(72)	0	360	720	1440	2160	MEAN
0	0.77	0.97	0.71	0.93	0.76	0.82
376	0.90	0.80	0.84	0.84	0.66	0.82
MEAN	0.83	0.89	0.77	0.88	0.71	0.82

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

TABLE	P205RES(73)	P205RES(72)	P205RES(73) P205RES(72)	
SED	0.170		0.176	MIN REP
	0.147	0.027	0.152	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.067	MIN REP
			0.047	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.294	35.8
BLOCK.WP.SP	31	0.116	14.1

2ND CUT MEAN DM% 24.6 2ND CUT PLOT AREA HARVESTED 0.00129

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

P205RES(73) / P205RES(72)	0	360	720	1440	2160	MEAN
0	5.71	6.18	5.61	6.99	5.68	5.98
376	6.00	6.07	5.67	6.14	5.09	5.83
MEAN	5.85	6.12	5.64	6.57	5.38	5.90

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

TABLE	P205RES(73)	P205RES(72)	P205RES(73) P205RES(72)	
SED	0.452		0.485	MIN REP
	0.392	0.101	0.420	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.248	MIN REP
			0.176	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.783	13.3
BLOCK.WP.SP	31	0.430	7.3

TOTAL OF 2 CUTS MEAN DM% 22.5

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79/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 and nutrient uptakes of barley - Woburn Butt Furlong.

Sponsor: J. McEwen.

The sixth year, spring barley.

For previous years see 74-78/W/RN/16.

Design: 4 series of 3 randomised blocks of 4 plots with PREVCROP on series.

Whole plot dimensions: 4.27 x 2.59.

Treatments: All combinations of:-

Series

1. PREVCROP — Previous cropping (1974-1977) (all in barley 1978):

P B	Wheat, sugar beet, barley, potatoes
W B	Sugar beet, barley, potatoes, wheat
S B	Barley, potatoes, wheat, sugar beet
B B	Potatoes, wheat, sugar beet, barley

Plots

2. PK SUB — Extra PK and subsoil treatment (applied autumn 1973):

	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.

Basal applications: Manures: All Series: (20:14:14) at 450 kg combine drilled. Weedkillers: Glyphosate at 1.7 kg in 280 l, Mecoprop, bromoxynil and ioxynil ('Brittox' 3.5 kg in 250 l).

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

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79/W/RN/16

Cultivations, etc.:- Glyphosate applied: 14 Sept, 1978. Ploughed: 17 Nov. Spring-tine cultivated, with crumbler attached, twice: 16 Apr, 1979, 20 Apr. Seed sown: 23 Apr. 'Brittox' applied: 1 June. Combine harvested: 28 Aug.

NOTE: Samples of grain were analysed for contents of N, P, K, Na, Ca and Mg.

GRAIN TONNES/HECTARE

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

PK SUB / PREVCROP	- -	- SUB	PKTOP -	- PKSUB	MEAN
P B	4.17	4.98	4.24	4.74	4.53
W B	3.04	3.34	3.07	3.44	3.22
S B	4.67	5.01	4.35	5.28	4.83
B B	2.82	3.21	2.80	3.11	2.99
MEAN	3.68	4.13	3.62	4.14	3.89

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

TABLE	PK SUB	PREVCROP* PK SUB
SED	0.150	0.300

* ONLY WHEN COMPARING MEANS WITH SAME LEVELS OF PREVCROP

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.278	7.1
BLOCK.WP.SP	24	0.368	9.5

GRAIN MEAN DM% 81.8

STRAW TONNES/HECTARE

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

PK SUB / PREVCROP	- -	- SUB	PKTOP -	- PKSUB	MEAN
P B	3.33	4.45	3.82	4.21	3.95
W B	3.48	3.58	3.25	3.87	3.55
S B	4.68	4.76	4.01	5.06	4.63
B B	2.95	3.35	2.86	3.23	3.10
MEAN	3.61	4.04	3.49	4.09	3.81

STRAW MEAN DM% 79.1

SUB PLOT AREA HARVESTED 0.00065

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79/R/CS/10 and 79/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.

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

The 18th year, fallow.

For previous years see 'Details' 1967, 1973 and 74-78/R&W/CS/10.

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

Whole plot dimensions: 6.40 x 18.3.

The experiments were fallowed in 1979 but additional treatment ground chalk was applied:

Ground chalk (tonnes):

R		W	
Total 1962-63	1979	Total 1962-63	1979
0	0	0	0
5	2	5	1
10	5	12	2
20	10	19	4

Basal application:
Sawyers I (R): Weedkiller: Glyphosate at 1.5 kg in 220 l.
Stackyard C (W): Weedkiller: Glyphosate at 1.5 kg in 280 l.

Cultivations, etc.:-
Sawyers I (R): Weedkiller applied: 24 Oct, 1978. Test chalk applied: 29 Nov. Ploughed: 21 Dec. Rotary cultivated: 12 June, 1979. Deep-tine cultivated: 3 July.
Stackyard C (W): Weedkiller applied: 14 Sept, 1978. Test chalk applied: 21 Nov. Ploughed: 22 Nov. Spring-tine cultivated with crumbler attached: 17 Apr, 1979. Rotary cultivated: 6 June. Rotary cultivated twice: 4 July, 16 Aug. Deep-tine cultivated: 21 Aug. Heavy spring-tine cultivated: 11 Sept.

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79/W/CS/11

SOIL STRUCTURE

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

Sponsor: A.E. Johnston.

The 16th year, wheat.

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 73-78/W/CS/11.

Design: Single replicate of 5 x 4.

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. N — Nitrogen fertiliser as ammonium nitrate (kg N) cumulative to previous treatments:

   0
   50
   100
   150

Basal applications: Manures: P at 85 kg, as triple superphosphate, K at 300 kg, as potassium bicarbonate, Mg at 55 kg, as magnesium sulphate. Weedkillers: Ioxynil 0.32 kg with mecoprop at 0.94 kg in 280 l on the first occasion, ioxynil at 0.42 kg with mecoprop at 1.3 kg in 280 l on the second occasion, applied with tridemorph on both occasions. Fungicides: Tridemorph at 0.53 kg applied with weedkillers. Carbendazim at 0.25 kg with zineb at 1.6 kg in 280 l.

Seed: Maris Hobbit, sown at 210 kg.

Cultivations, etc.:- Hand dug: 12 Sept, 1978. P, K, Mg applied and raked in, seed sown: 3 Oct. Weedkillers and tridemorph applied: 17 Nov. N applied: 23 Apr, 1979. Weedkillers and tridemorph applied: 9 May. Carbendazim and zineb applied: 20 June. Hand harvested: 16 Aug.

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

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79/W/CS/11

GRAIN TONNES/HECTARE

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

PEAT N	0	8	55	110	165	MEAN
0	3.76	3.32	3.90	5.19	4.42	4.12
50	7.23	7.40	6.80	7.43	6.99	7.17
100	7.19	8.90	8.33	7.84	8.34	8.12
150	8.20	7.43	8.69	7.73	8.42	8.09
MEAN	6.59	6.76	6.93	7.05	7.05	6.88

GRAIN MEAN DM% 81.1

STRAW TONNES/HECTARE

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

PEAT N	0	8	55	110	165	MEAN
0	4.47	4.26	4.63	5.54	4.93	4.77
50	7.55	8.05	7.01	8.13	7.75	7.70
100	7.63	8.59	8.51	8.24	8.64	8.32
150	8.53	8.13	8.58	8.51	8.92	8.53
MEAN	7.04	7.26	7.18	7.60	7.56	7.33

STRAW MEAN DM% 73.4

PLOT AREA HARVESTED 0.00065

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79/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. 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 15th year, old grass.

For previous years see 'Details' 1973 and 74-78/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 0.84 kg with mecoprop at 2.5 kg in 280 l applied on 1 June, 1979.

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

Cultivations, etc.:- Basal P and Mg applied: 21 Nov, 1978. NK applied: 23 Mar, 1979, 22 May, and 11 July. Cut: 22 May, 11 July, 4 Oct.

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79/R/CS/13

1ST CUT (22/5/79) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.29	1.37	1.24	1.57	2.40	3.30	3.54	3.63	1.90

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

TABLE	TOTAL N	
SED	0.161	MIN REP
	0.139	MAX-MIN
	0.114	MAX REP

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

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.227	12.0

1ST CUT MEAN DM% 18.3

1ST CUT PLOT AREA HARVESTED 0.00086

2ND CUT (11/7/79)DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.58	3.47	2.68	3.00	3.29	3.83	3.81	3.64	2.83

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

TABLE	TOTAL N	
SED	0.194	MIN REP
	0.168	MAX-MIN
	0.137	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.274	9.7

2ND CUT MEAN DM% 23.2

2ND CUT PLOT AREA HARVESTED 0.00092

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79/R/CS/13

3RD CUT (4/10/79)DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.70	2.81	2.10	2.35	2.91	2.85	2.55	2.74	2.25

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

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

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.331	14.7

3RD CUT MEAN DM% 20.0

3RD CUT PLOT AREA HARVESTED 0.00086

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	1.57	7.65	6.02	6.92	8.59	9.98	9.90	10.01	6.99

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

TABLE	TOTAL N	
SED	0.381	MIN REP
	0.330	MAX-MIN
	0.269	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.538	7.7

TOTAL OF 3 CUTS MEAN DM% 20.5

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79/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 12th year, continuous winter wheat (after continuous barley 1968-1973).

For previous years see 'Details' 1973 and 74-78/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 — Nitrogen fertiliser, applied cumulatively to test applications 1970-1973 and 1978 (basal application only in 1974-1977) (kg N):

50
100
150
200

Basal applications: Autumn weedkiller: Glyphosate at 1.5 kg in 220 l. Spring weedkiller: Mecoprop at 2.5 kg in 220 l.

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.:- Autumn weedkiller applied: 2 Oct, 1978. Ploughed: 17 Oct. Heavy spring-tine cultivated: 23 Oct. P and K applied: 24 Oct. Disc harrowed, rotary harrowed, seed sown: 25 Oct. N applied: 4 May, 1979. Spring weedkiller applied: 10 May. Combine harvested: 1 Sept.

NOTE: The crop was sampled in July for take-all and eyespot assessments.

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79/R/CS/24

GRAIN TONNES/HECTARE

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

P / N	0	15 A	60 A	90 S	360 S	MEAN
50	3.55	3.98	4.24	3.96	4.24	3.99
100	3.51	4.67	4.87	4.56	5.07	4.54
150	3.82	4.17	5.34	4.42	5.15	4.58
200	3.82	4.44	5.44	4.03	5.03	4.55
MEAN	3.68	4.32	4.98	4.24	4.87	4.42

N / K	50	100	150	200	MEAN
30	3.85	4.23	4.12	4.23	4.11
120	4.14	4.84	5.04	4.88	4.73
MEAN	3.99	4.54	4.58	4.55	4.42

P / K	0	15 A	60 A	90 S	360 S	MEAN
30	3.49	3.75	4.60	4.07	4.62	4.11
120	3.86	4.88	5.35	4.42	5.12	4.73
MEAN	3.68	4.32	4.98	4.24	4.87	4.42

P	N / K	50	100	150	200
0	30	3.57	3.27	3.59	3.53
	120	3.54	3.75	4.05	4.12
15 A	30	3.69	4.32	3.25	3.73
	120	4.26	5.03	5.09	5.15
60 A	30	3.97	4.36	4.82	5.27
	120	4.51	5.39	5.87	5.62
90 S	30	3.69	4.54	4.03	4.03
	120	4.24	4.57	4.82	4.04
360 S	30	4.31	4.67	4.92	4.57
	120	4.16	5.47	5.38	5.48

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

TABLE	P	K	N	P K
SED	0.139	0.088	0.125	0.197

TABLE	P N	K N	P K N
SED	0.279	0.177	0.415

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

STRATUM	DF	SE	CV%
BLOCK.WP+BLOCK.WP.SP	37	0.394	8.9

GRAIN MEAN DM% 85.0

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79/R/CS/24

STRAW TONNES/HECTARE

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

P / N	0	15 A	60 A	90 S	360 S	MEAN
50	3.13	3.38	3.80	3.45	3.67	3.49
100	3.08	4.15	4.54	4.23	4.48	4.10
150	3.60	4.03	4.79	4.48	4.96	4.37
200	3.34	4.03	4.94	3.73	4.52	4.11
MEAN	3.29	3.90	4.52	3.97	4.41	4.02

N / K	50	100	150	200	MEAN
30	3.27	3.62	3.85	3.62	3.59
120	3.70	4.58	4.89	4.60	4.44
MEAN	3.49	4.10	4.37	4.11	4.02

P / K	0	15 A	60 A	90 S	360 S	MEAN
30	3.12	3.20	3.92	3.72	4.00	3.59
120	3.46	4.59	5.12	4.23	4.82	4.44
MEAN	3.29	3.90	4.52	3.97	4.41	4.02

P	N / K	50	100	150	200
0	30	3.21	2.76	3.50	3.01
	120	3.06	3.41	3.70	3.67
15 A	30	2.84	3.64	3.16	3.16
	120	3.92	4.65	4.90	4.90
60 A	30	3.38	3.80	3.98	4.51
	120	4.22	5.28	5.59	5.38
90 S	30	3.13	4.07	3.96	3.71
	120	3.77	4.40	4.99	3.76
360 S	30	3.79	3.82	4.65	3.73
	120	3.55	5.14	5.27	5.30

STRAW MEAN DM% 87.7

PLOT AREA HARVESTED 0.00270

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79/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 tenth year, potatoes, wheat, barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-78/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	70	71	72	73	74	75	76	77	78	79
Series I	P	P	P*	SB	B	P	P*	W	B	P	P*
Series II	P	P	P	P*	SB	B	P	P*	W	B	P
Series III	P	B	P	P	P*	SB	B	P	P*	W	B
Series IV	P	B	P	P	P	P*	SB	B	P	P*	W

P = potatoes, SB = sugar beet, B = barley, W = wheat

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

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

1. NEMACIDE(79) Nematicides applied 1979:

ALDICARB	Aldicarb
CARBENDA	Carbendazim
TERBUFOS	Terbufos

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

SINGLE	Single (2.5 kg for aldicarb and terbufos : 5.0 kg for carbendazim)
DOUBLE	Double (5.0 kg for aldicarb and terbufos : 10.0 kg for carbendazim)
QUAD	Quadruple (10.0 kg for aldicarb and terbufos : 20.0 kg for carbendazim)

plus one untreated plot

RATE

NONE

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

1. NEMACIDE(76) Residues of nematicides applied 1976:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

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79/W/CS/34

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

plus one untreated plot

RATE

NONE

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

1. NEMACIDE(77) Residues of 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

plus one untreated plot

RATE

NONE

Treatments to wheat (Series IV): All combinations of:-

1. NEMACIDE(78) Residues of nematicides applied 1978:

BENDIOCA	Bendiocarb
THIOPHAN	Thiophanate methyl
TERBUFOS	Terbufos

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

5
10
20

plus one untreated plot

RATE

0

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79/W/CS/34

Standard applications:
Potatoes (Series I & II): Manures: (13:13:20) at 1850 kg. Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l on six occasions, with insecticide on the first two. Insecticide: Pirimicarb at 0.14 kg on two occasions, with fungicide. Haulm desiccant: Undiluted BOV at 170 l (Series II only).
Wheat (Series IV): Manures: Magnesian limestone at 5 t. (10:24:24) at 260 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg in 250 l).
Barley (Series III): Manures: (20:14:14) at 450 kg, combine drilled. Weedkillers: Bromoxynil with ioxynil ('Oxytril CM' at 2.1 kg in 250 l).

Seed: Potatoes: Pentland Crown.
Wheat: Flanders, sown at 180 kg.
Barley: Porthos, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Potatoes (Series I & II): Heavy spring-tine cultivated: 13 Sept, 1978 (Series II). Heavy spring-tine cultivated: 19 Oct. Ploughed: 3 Apr, 1979. NPK applied: 4 May. Spring-tine cultivated: 8 May. Rotary cultivated, potatoes planted: 9 May (Series II). Treatments applied, spring-tine cultivated: 11 May (Series I). Rotary cultivated, potatoes planted: 14 May (Series I). Weedkillers applied: 25 May. Rotary ridged: 19 June. Fungicide applied: 27 June, 10 July, 23 July, 11 Aug, 25 Aug, 5 Sept. Insecticide applied: 27 June, 10 July. Haulm desiccant applied: 24 Sept (Series II). Haulm mechanically destroyed: 8 Oct. Lifted: 24 Oct.
Wheat (Series IV): Magnesian limestone applied, deep-tine cultivated, spring-tine cultivated with crumbler attached, seed sown: 13 Oct, 1978. N applied: 19 Apr, 1979. Weedkillers applied: 14 May. Combine harvested: 31 Aug.
Barley (Series III): Heavy spring-tine cultivated: 13 Sept, 1978. Ploughed: 3 Apr, 1979. Spring-tine cultivated with crumbler attached: 21 Apr. Seed sown: 23 Apr. Weedkillers applied: 4 June. Combine harvested: 28 Aug.

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

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79/W/CS/34

POTATOES SERIES I

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	39.3	48.3	42.0	43.2
CARBENDA	18.6	20.6	27.1	22.1
TERBUFOS	23.6	32.1	32.0	29.2
MEAN	27.1	33.7	33.7	31.5

RATE NONE 14.8

GRAND MEAN 29.8

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

TABLE	NEMACIDE(79)	RATE NEMACIDE(79)	RATE & RATE NONE
SED	1.48	1.48	2.57

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.15	10.6

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE(79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	93.1	95.1	93.2	93.8
CARBENDA	92.9	91.9	93.6	92.8
TERBUFOS	92.0	91.3	93.2	92.2
MEAN	92.7	92.8	93.3	92.9

RATE NONE 91.2

GRAND MEAN 92.8

PLOT AREA HARVESTED 0.00130

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79/W/CS/34

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(76)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	29.3	32.7	31.5	31.2
CARBOFUR	29.9	27.2	28.7	28.6
PHOXIM	25.6	24.8	25.9	25.4
MEAN	28.3	28.2	28.7	28.4

RATE NONE 29.0

GRAND MEAN 28.5

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

TABLE	NEMACIDE(76)	RATE NEMACIDE(76)	RATE & RATE NONE
SED	0.82	0.82	1.42

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	1.74	6.1

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

NEMACIDE(76)				
AC 64475	94.3	95.1	93.9	94.4
CARBOFUR	94.2	93.6	93.6	93.8
PHOXIM	93.0	92.1	92.3	92.5
MEAN	93.8	93.6	93.3	93.6

RATE NONE 94.3

GRAND MEAN 93.7

PLOT AREA HARVESTED 0.00130

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79/W/CS/34

WHEAT SERIES IV

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(78)	5	10	20	MEAN
BENDIOCA	2.74	2.82	3.52	3.03
THIOPHAN	2.95	2.49	3.22	2.89
TERBUFOS	3.24	3.74	3.94	3.64
MEAN	2.98	3.02	3.56	3.18

RATE 0 3.22

GRAND MEAN 3.19

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

TABLE	NEMACIDE(78)	RATE NEMACIDE(78)	RATE & RATE 0
SED	0.154	0.154	0.267

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.328	10.3

GRAIN MEAN DM% 86.5

STRAW TONNES/HECTARE

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

RATE NEMACIDE(78)	5	10	20	MEAN
BENDIOCA	2.91	3.27	3.77	3.32
THIOPHAN	3.14	2.72	3.53	3.13
TERBUFOS	3.00	3.51	3.40	3.30
MEAN	3.02	3.17	3.56	3.25

RATE 0 3.53

GRAND MEAN 3.28

STRAW MEAN DM% 86.4

PLOT AREA HARVESTED 0.00260

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79/W/CS/34

BARLEY SERIES III

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	3.28	3.06	3.18	3.17
CARBOFUR	2.88	3.19	3.21	3.09
PHOXIM	3.19	2.79	3.08	3.02
MEAN	3.12	3.01	3.16	3.10

RATE NONE 3.13

GRAND MEAN 3.10

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

TABLE	NEMACIDE(77)	RATE NEMACIDE(77)	RATE & RATE NONE
SED	0.109	0.109	0.188

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.230	7.4

GRAIN MEAN DM% 84.5.

STRAW TONNES/HECTARE

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

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	1.81	1.77	1.85	1.81
CARBOFUR	1.63	1.90	1.76	1.76
PHOXIM	1.68	1.75	1.79	1.74
MEAN	1.71	1.81	1.80	1.77

RATE NONE 1.81

GRAND MEAN 1.78

STRAW MEAN DM% 92.0

PLOT AREA HARVESTED 0.00260

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79/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 eighth year, potatoes, wheat.

For previous years see 72/W/CS/35(t) and 73-78/W/CS/35.

Design: 3 series each 4 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 6.10.

Treatments:-

The experiment has three series with the following cropping:-

	1968-71	72	73	74	75	76	77	78	79
Series I	P	P*	SB	B	P*	P	P	P*	W
Series II	P	P	P*	SB	B	P*	P	P	P*
Series III	P	P	P	P*	SB	B	P*	P	P

P = Potatoes, SB = Sugar beet, B = Barley, W = wheat

*Treatments applied to potatoes, following two crops test residual effects.

Treatments:

On Series I, wheat 1979, new sets of treatments were applied for potatoes in 1978 which ignored those applied in earlier years. All combinations of:-

1. A NEM(78) Residual effects of nematicide applied autumn 1977:

   NONE None
   TELONE 'Telone' at 224 kg

2. S NEM(78) Residual effects of nematicide applied spring 1978:

   ALDICARB
   OXAMYL

3. SNEMRATE Rates of spring nematicides (kg):

   2.5
   5.0
   7.5
   10.0

plus two untreated plots per block

RATE

NONE

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79/W/CS/35

On Series II the same sets of treatments were applied for potatoes in 1979, ignoring those applied in earlier years. All combinations of:-

1. A NEM(79) Autumn nematicide:

NONE	None
TELONE	'Telone' at 224 kg

2. S NEM(79) Spring nematicide:

ALDICARB
OXAMYL

3. SNEMRATE Rates of spring nematicides (kg):

2.5
5.0
7.5
10.0

plus two untreated plots per block

RATE

NONE

On Series III residual effects of treatments in the previous scheme are tested on potatoes 1979. All combinations of:-

1. VARIETY Residual effects of varieties:

	1974	1977-79
(PC)PC3	Pentland Crown	Pentland Crown
(MP)PC3	Maris Piper	Pentland Crown

2. NEM RES(77) Residual effects of nematicides (kg) applied for potatoes 1974 & 1977:

NONE	None
DAZ 2	Dazomet at 220
DAZ 3	Dazomet at 330
DAZ 4	Dazomet at 440
DAZ 6	Dazomet at 660
DAZ2+TE2	Dazomet at 220 plus 'Telone' at 220
TE4	'Telone' at 450
OX	Oxamyl at 5.6
TE2+OX	'Telone' at 220 plus oxamyl at 5.6

Standard applications:
Wheat (Series I): Manures: Magnesian limestone at 5 t. (10:24:24) at 260 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg in 250 l).
Potatoes (Series II & III): Manures: (13:13:20) at 1850 kg. Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 250 l (Series III only). Fungicide: Mancozeb at 1.3 kg in 250 l on six occasions, with insecticide on the first two. Insecticide: Pirimicarb at 0.14 kg on two occasions with fungicide. Haulm desiccant: Undiluted BOV at 170 l (Series III only).

Seed: Wheat: Flanders, sown at 180 kg.
Potatoes: Pentland Crown.

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79/W/CS/35

Cultivations, etc.:-

Wheat (Series I): Magnesian limestone applied: 9 Oct, 1978. Heavy spring-tine cultivated twice: 10 Oct. Rotary cultivated: 10 Oct. Seed sown: 11 Oct. N applied: 21 Apr, 1979. Weedkillers applied: 15 May. Combine harvested: 30 Aug.

Potatoes (Series II): Heavy spring-tine cultivated twice: 10 Oct, 1978, 16 Oct. Spring-tine cultivated, 'Telone' injected, spring-tine cultivated: 21 Nov. NPK applied: 5 May, 1979. Spring-tine cultivated: 8 May. Aldicarb and oxamyl applied: 9 May. Rotary cultivated, potatoes planted: 10 May. Grubbed: 7 June. Rotary ridged: 19 June. Fungicide applied: 26 June, 10 July, 23 July, 8 Aug, 25 Aug, 6 Sept. Insecticide applied: 26 June, 10 July. Haulm mechanically destroyed: 8 Oct. Lifted: 24 Oct.

Potatoes (Series III): Heavy spring-tine cultivated: 16 Oct, 1978. NPK applied: 5 May, 1979. Spring-tine cultivated: 8 May. Rotary cultivated, potatoes planted: 9 May. Weedkillers applied: 25 May. Rotary ridged: 19 June. Fungicide applied: 26 June, 10 July, 23 July, 8 Aug, 25 Aug, 6 Sept. Haulm desiccant applied and haulm mechanically destroyed: 25 Sept. Lifted: 9 Oct.

NOTES: (1) Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of Globodera rostochiensis.

(2) Because of soil erosion damage the yields of four plots of potatoes, Series II, were lost, those with treatment combinations:

A NEM(79)	TELONE	NONE	TELONE
S NEM(79)	OXAMYL	ALDICARB	OXAMYL
SNEMRATE	2.5	2.5	7.5

and one RATE NONE plot.

Estimated values were used in the analysis.

(3) Because of storm damage the yields of six plots of wheat, Series I, were lost, those with treatment combinations:

A NEM(78)	NONE	NONE	NONE	TELONE	NONE	TELONE
S NEM(78)	OXAMYL	ALDICARB	OXAMYL	ALDICARB	ALDICARB	ALDICARB
SNEMRATE	2.5	2.5	7.5	7.5	7.5	10.0

Estimated values were used in the analysis.

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79/W/CS/35

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

S NEM(79) / A NEM(79)	ALDICARB	OXAMYL	MEAN
NONE	49.7	52.9	51.3
TELONE	55.5	52.7	54.1
MEAN	52.6	52.8	52.7

SNEMRATE / A NEM(79)	2.5	5.0	7.5	10.0	MEAN
NONE	46.4	55.3	52.4	51.3	51.3
TELONE	56.5	53.5	52.4	54.0	54.1
MEAN	51.5	54.4	52.4	52.7	52.7

SNEMRATE / S NEM(79)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	50.2	54.4	52.0	54.0	52.6
OXAMYL	52.7	54.3	52.9	51.4	52.8
MEAN	51.5	54.4	52.4	52.7	52.7

A NEM(79)	SNEMRATE / S NEM(79)	2.5	5.0	7.5	10.0
NONE	ALDICARB	44.3	54.5	48.6	51.6
	OXAMYL	48.6	56.0	56.1	51.0
TELONE	ALDICARB	56.1	54.3	55.3	56.4
	OXAMYL	56.9	52.6	49.6	51.7

RATE NONE 24.3

GRAND MEAN 49.6

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

TABLE	A NEM(79)	S NEM(79)	SNEMRATE
SED	1.68	1.68	2.37

TABLE	A NEM(79) S NEM(79)	A NEM(79) SNEMRATE	S NEM(79) SNEMRATE	A NEM(79) S NEM(79) SNEMRATE & RATE NONE
SED	2.37	3.35	3.35	4.74 4.11*

* USE ONLY FOR COMPARISONS OF RATE NONE V ANY OF THE REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	48	6.71	13.5

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79/W/CS/35

POTATOES SERIES II

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

S NEM(79) / A NEM(79)	ALDICARB	OXAMYL	MEAN
NONE	94.5	93.7	94.1
TELONE	94.8	93.2	94.0
MEAN	94.6	93.5	94.1

SNEMRATE / A NEM(79)	2.5	5.0	7.5	10.0	MEAN
NONE	94.6	93.9	94.1	93.7	94.1
TELONE	94.5	93.6	94.1	93.9	94.0
MEAN	94.6	93.8	94.1	93.8	94.1

SNEMRATE / S NEM(79)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	94.9	94.5	94.3	94.9	94.6
OXAMYL	94.2	93.0	93.9	92.7	93.5
MEAN	94.6	93.8	94.1	93.8	94.1

SNEMRATE	2.5	5.0	7.5	10.0
A NEM(79) / S NEM(79)				
NONE / ALDICARB	95.0	94.4	94.2	94.5
NONE / OXAMYL	94.3	93.5	94.0	93.0
TELONE / ALDICARB	94.8	94.6	94.4	95.3
TELONE / OXAMYL	94.2	92.6	93.9	92.4

RATE NONE 89.2

GRAND MEAN 93.5

PLOT AREA HARVESTED 0.00087

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79/W/CS/35 POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

VARIETY NEM RES(77)	(PC)PC3	(MP)PC3	MEAN
NONE	16.7	13.1	14.9
DAZ 2	9.0	11.9	10.4
DAZ 3	13.3	10.5	11.9
DAZ 4	10.7	19.6	15.1
DAZ 6	12.7	21.2	17.0
DAZ2+TE2	11.5	14.2	12.8
TE4	14.8	10.6	12.7
OX	10.5	13.7	12.1
TE2+OX	10.7	24.8	17.7
MEAN	12.2	15.5	13.9

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

TABLE	NEM RES(77)	VARIETY NEM RES(77) VARIETY
SED	2.40	1.07	3.38

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

STRATUM	DF	SE	CV%
BLOCK.WP	47	4.55	32.8

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

VARIETY NEM RES(77)	(PC)PC3	(MP)PC3	MEAN
NONE	85.9	84.4	85.2
DAZ 2	78.6	77.8	78.2
DAZ 3	85.6	79.4	82.5
DAZ 4	83.7	90.5	87.1
DAZ 6	85.2	87.1	86.1
DAZ2+TE2	81.1	87.5	84.3
TE4	83.5	73.6	78.6
OX	78.6	78.5	78.5
TE2+OX	76.3	89.6	83.0
MEAN	82.0	83.2	82.6

PLOT AREA HARVESTED 0.00087

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79/W/CS/35

WHEAT SERIES I

GRAIN TONNES/HECTARE

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

S NEM(78) / A NEM(78)	ALDICARB	OXAMYL	MEAN
NONE	5.15	5.31	5.23
TELONE	5.80	5.56	5.68
MEAN	5.47	5.43	5.45

SNEMRATE / A NEM(78)	2.5	5.0	7.5	10.0	MEAN
NONE	5.35	5.55	5.14	4.90	5.23
TELONE	5.61	5.78	5.48	5.83	5.68
MEAN	5.48	5.67	5.31	5.37	5.45

SNEMRATE / S NEM(78)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	5.37	5.73	5.24	5.55	5.47
OXAMYL	5.58	5.60	5.37	5.18	5.43
MEAN	5.48	5.67	5.31	5.37	5.45

A NEM(78)	SNEMRATE / S NEM(78)	2.5	5.0	7.5	10.0
NONE	ALDICARB	5.07	5.61	4.96	4.98
	OXAMYL	5.62	5.49	5.31	4.81
TELONE	ALDICARB	5.68	5.86	5.53	6.12
	OXAMYL	5.54	5.70	5.43	5.55

RATE NONE 5.18

GRAND MEAN 5.42

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

TABLE	A NEM(78)	S NEM(78)	SNEMRATE
SED	0.115	0.115	0.163

TABLE	A NEM(78) S NEM(78)	A NEM(78) SNEMRATE	S NEM(78) SNEMRATE	A NEM(78) S NEM(78) SNEMRATE & RATE NONE
SED	0.163	0.230	0.230	0.326 0.282*

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

STRATUM	DF	SE	CV%
WP	46	0.460	8.5

GRAIN MEAN DM% 85.7

PLOT AREA HARVESTED 0.00173

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79/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 11th year, old grass, new grass.

For previous years see 69/R/CS/41(t), 70/R/CS/41(t) and 71-78/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

Basal applications: Manures: Chalk at 7.5 t. (0:14:28) at 500 kg. (25:0:16) at 440 kg in the spring and at 220 kg after each of the first two cuts.

Standard applications: To AMR, SMR, SFR plots: Weedkillers: Benazolin, MCPA and 2,4D-B (as 'Legumex Extra' at 7.0 kg) in 220 l.

Seed mixture for 1979: RvP Erecta timothy at 7 kg. S215 meadow fescue at 14 kg. New Zealand Huia white clover at 3 kg. Mixture sown at 24 kg.

Cultivations, etc.:- Basal PK applied: 16 Nov, 1978. Chalk applied: 14 Dec. AMR plots ploughed: 22 Jan, 1979. NK applied: 5 Mar, 13 June, 26 July. SFR and SMR plots ploughed: 15 Mar. Cut (excluding AMR, SMR, SFR plots): 31 May. AMR, SMR & SFR plots rotary harrowed: 5 June. AMR and SMR plots disc harrowed twice; AMR, SMR, SFR plots rotary harrowed and sown: 11 June. Weedkillers applied to AMR, SMR and SFR plots: 10 July. AMR, SMR and SFR plots topped: 19 July. All plots cut: 24 July, 28 Sept.

NOTE: Soil cores were taken to assess total soil fauna and quadrats were sampled on each plot for earthworms in autumn and spring.

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79/R/CS/41

1ST CUTTING OCCASION (31/5/79) DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	MEAN
	4.29	4.26	3.59	4.08	4.10

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

TABLE	CULTIVTN	
SED	0.560	MIN REP
	0.485	MAX-MIN

	CULTIVTN
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	13	0.792	19.3

1ST CUTTING OCCASION MEAN DM% 15.8

2ND CUTTING OCCASION (24/7/79)DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	MEAN
	2.39	2.53	2.57	2.91	2.56

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

TABLE	CULTIVTN	
SED	0.316	MIN REP
	0.274	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	13	0.447	17.5

2ND CUTTING OCCASION MEAN DM% 18.7

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79/R/CS/41

3RD CUTTING OCCASION (28/9/79) DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	SFR	SMR	AMR	MEAN
	2.74	2.27	2.45	2.39	2.25	1.79	1.92	2.32

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

TABLE	CULTIVTN	
SED	0.307	MIN REP
	0.266	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.434	18.7

3RD CUTTING OCCASION MEAN DM% 23.8

TOTAL OF 3 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE

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

CULTIVTN	0	SF	SM	AM	SFR	SMR	AMR	MEAN
	9.42	9.06	8.61	9.38	2.25	1.79	1.92	6.48

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

TABLE	CULTIVTN	
SED	0.742	MIN REP *
	0.642	MAX-MIN *
	0.274	**

* ONLY FOR LEVELS 0, SF, SM AND AM OF CULTIVTN
** ONLY FOR LEVELS SFR, SMR AND AMR OF CULTIVTN

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

STRATUM	DF	SE	CV%
BLOCK.WP*	13	1.049	11.4
BLOCK.WP**	6	0.387	19.5

TOTAL OF 3 CUTTING OCCASIONS MEAN DM% 20.1

PLOT AREA HARVESTED 0.00074

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79/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 ninth year, maize.

For previous years see 71/W/CS/66(t), 72/W/CS/66(t) and 73-78/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 1971-79:	
0		
450		

Sub plots

2. N	Nitrogen fertiliser (kg N as 'Nitro-Chalk') cumulative 1971-79:
50	50 to seedbed
100	100 to seedbed
150	150 to seedbed
50+100	100 to seedbed, 50 four weeks before sowing (before 1978 this treatment received 100 to seedbed, 50 five weeks after emergence)

Basal applications: Manures: (0:14:28) at 870 kg. Weedkiller: Atrazine at 1.1 kg in 340 l.

Seed: Fronica, sown at 103,300 seeds per hectare.

Cultivations, etc.:- Ploughed: 17 Nov, 1978. Spring-tine cultivated: 20 Nov. Dazomet applied, rotary cultivated: 23 Nov. Early N applied: 19 Apr, 1979. PK applied: 7 May. Spring-tine cultivated with crumbler attached: 8 May. Seed sown: 17 May. Seedbed N applied: 4 June. Weedkiller applied: 6 June. Hand harvested: 24 Oct.

NOTES: (1) Soil samples were taken before sowing and after harvest for counts of ectoparasitic nematodes.
(2) Counts were made of common smut (Ustilago maydis) and stalk rots (Fusarium spp.).
(3) Because of bird damage, yields from 2 whole plots were lost, those with DAZOMET 0 and 450. Estimated values were used in the analysis.

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79/W/CS/66

FORAGE DRY MATTER TONNES/HECTARE

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

N DAZOMET	50	100	150	50+100	MEAN
0	8.39	10.14	12.55	11.25	10.58
450	11.54	11.82	14.69	12.41	12.61
MEAN	9.96	10.98	13.62	11.83	11.60

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

TABLE	N	DAZOMET* N
SED	0.605	0.856

* WITHIN THE SAME LEVEL OF DAZOMET ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	12	1.211	10.4

GRAIN MEAN DM% 27.2

SUB PLOT AREA HARVESTED 0.00039

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79/W/CS/99

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study factors affecting the incidence of take-all (Gaeumannomyces graminis) and effects on yields of barley - Woburn, Butt Furlong.

Sponsor: D. Hornby.

The seventh year, barley, beans, oats.

For previous years see 72/W/CS/99(t) and 73-78/W/CS/99.

Design: 2 blocks of 9 plots.

Whole plot dimensions: 5.33 x 15.2.

Treatments: Crop sequences, soil sterilant and inoculum:-

TREATMNT	1968-71	72	73	74	75	76	77	78	79
B 12	B	B	B	B	B	B	B	B	B
	B	F	B	B	B	B	B	B	F
B 6+S	B	F	BE	B	B	B	B	B	B(S)
B 5	B	B	F	BE	B	B	B	B	B
B 4	B	B	B	F	BE	B	B	B	B
B 3+S+I	B	B	B	B	F	BE	B	B	B(SI)
B 2+I	B	B	B	B	B	F	BE	B	B(I)
	B	B	B	B	B	B	F	BE	O
	B	B	B	B	B	B	B	F	BE

B = Barley, BE = Beans, F = Fallow, O = Oats
S = Soil sterilant: Formalin at 1190 l in 54,200 l
I = Inoculum of take-all applied on colonised autoclaved oats and combine drilled in the ratio of three oats to one barley seed, mixture sown at 310 kg.

Standard applications:
Barley and Oats: Manures: (20:14:14) at 450 kg.
Spring beans: Manures: (0:14:28) at 400 kg. Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Barley: Porthos, dressed with ethirimol, sown at 160 kg.
Oats: Panema, sown at 180 kg.
Spring beans: Minden, sown at 220 kg.

Cultivations, etc.:-
All plots: Ploughed: 17 Nov, 1978. Spring-tine cultivated with crumbler attached: 14 Apr, 1979.
Fallow: Spring-tine cultivated with crumbler attached: 8 May, 1979. Rotary cultivated: 8 June.
Barley: Formalin applied: 18 Apr, 1979. NPK applied, spring-tine cultivated with crumbler attached, seed sown and seed with inoculum combine drilled: 8 May. Combine harvested: 28 Aug.
Oats: NPK applied, spring-tine cultivated, seed sown: 8 May. Harvested by hand: 4 Oct.
Spring beans: Spring-tine cultivated with crumbler attached, PK applied, seed sown: 8 May. Insecticide applied: 11 July. Combine harvested: 10 Sept.

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79/W/CS/99

NOTES: (1) Soil samples were taken before treatments were applied for estimates of Heterodera avenae cysts and eggs and incidence of microflora.
(2) Plant samples were taken in July for incidence of 'take-all'.

BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT	B 12	B 6+S	B 5	B 4	B 3+S+I	B 2+I	MEAN
	1.97	2.36	2.48	2.34	1.24	1.56	1.99

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

TABLE	TREATMNT
SED	0.183

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.183	9.2

GRAIN MEAN DM% 82.3

PLOT AREA HARVESTED 0.00434

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79/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 sixth year, ley.

For previous years see 74-78/R/CS/130.

Design: 3 blocks of 4 plots.

Whole plot dimensions: 8.53 x 9.14.

Treatments: Inoculation with earthworm species in 1974, 1975 and 1979:

WORMSPEC	
NONE	None
ALLOLOBO	Allolobophora longa at 15,000 per hectare in 1974; 5,000 in 1975; 96,000 in 1979
LUMBRICU	Lumbricus terrestris at 5,000 per hectare in 1974 and 1975; 96,000 in 1979
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, none in 1979

NOTES: (1) The experiment was ploughed in error in July 1976 and resown in autumn 1976.
(2) Earthworms for the 1979 crop were applied on 1 Dec, 1978 to one block only. Applications to other blocks were unavoidably postponed.

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.:- PK applied: 16 Nov, 1978. NK applied: 5 Mar, 1979. Cut three times: 5 June, 23 July, 27 Sept. NK applied: 12 June, 27 July.

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79/R/CS/130

1ST CUT (5/6/79) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	3.52	3.50	3.55	3.79	3.59

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

TABLE	WORMSPEC
SED	0.239

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.293	8.2

1ST CUT MEAN DM% 18.3

2ND CUT (23/7/79) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	2.19	1.77	1.81	1.96	1.93

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

TABLE	WORMSPEC
SED	0.318

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.390	20.2

2ND CUT MEAN DM% 30.1

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79/R/CS/130

3RD CUT (27/9/79) DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	2.18	2.39	2.19	2.35	2.28

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

TABLE	WORMSPEC
SED	0.238

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.292	12.8

3RD CUT MEAN DM% 26.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	7.90	7.66	7.55	8.10	7.80

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

TABLE	WORMSPEC
SED	0.606

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.742	9.5

TOTAL OF 3 CUTS MEAN DM% 25.0

PLOT AREA HARVESTED 0.00046

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79/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 sixth year, old grass.

For previous years see 74-78/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 each of the first two cuts.

Cultivations, etc.:- PK applied: 15 Nov, 1978. NK applied: 5 Mar, 1977. Cut three times: 4 June, 24 July, 27 Sept. NK applied: 14 June, 26 July.

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79/R/CS/131

1ST CUT (4/6/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	3.91	3.75	4.10	3.92

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

TABLE	CHEMICAL	
SED	0.257	MIN REP
	0.223	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	0.364	9.3

1ST CUT MEAN DM% 16.6

2ND CUT (24/7/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	3.26	3.19	3.22	3.24

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

TABLE	CHEMICAL	
SED	0.206	MIN REP
	0.179	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.292	9.0

2ND CUT MEAN DM% 22.0

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79/R/CS/131

3RD CUT (27/9/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	2.60	2.67	2.63	2.62

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

TABLE	CHEMICAL	
SED	0.166	MIN REP
	0.144	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.235	8.9

3RD CUT MEAN DM% 28.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CHEMICAL	NONE	BENOMYL	CHLORDAN	MEAN
	9.77	9.61	9.95	9.78

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

TABLE	CHEMICAL	
SED	0.397	MIN REP
	0.344	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.561	5.7

TOTAL OF 3 CUTS MEAN DM% 22.3

PLOT AREA HARVESTED 0.00046

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79/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 sixth year, forage maize.

For previous years see 74-78/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 (2 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 & 1979)
PERMETH	Permethrin, 0.15 kg as foliar spray on 3 Aug (1979 only)
PHORATE	Phorate, 1.68 kg as granules to seedbed
PIRIMICA	Pirimicarb, 0.14 kg as foliar spray on 3 Aug (1979 only)
BE/DA/PH	Benomyl + dazomet (not applied 1975 & 1979) + phorate, at above rates and times

Sub plots

2. N — Nitrogen fertiliser (kg N):

50
100
150

NOTE: Treatment sprays were applied in 340 l.

Basal applications: Weedkiller: Atrazine at 1.7 kg in 340 l.

Seed: Caldera 535, sown at 100,000 seeds per hectare.

Cultivations, etc.:- Ploughed: 9 Feb, 1979. Spring-tine cultivated: 16 May. Seedbed treatments applied, power harrowed, seed sown: 8 June. Weedkiller applied: 11 June. Harvested by hand: 8 Nov.

NOTES: (1) Germination was assessed in June.
(2) Frit fly (Oscinella frit) damage was assessed.
(3) N percentages in harvest produce were determined.

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79/R/CS/133

FORAGE MAIZE TONNES/HECTARE

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

N	50	100	150	MEAN
CHEMICAL				
NONE	5.73	5.94	5.87	5.85
ALDICARB	6.67	6.59	8.14	7.13
BENOMYL	6.08	6.38	6.87	6.44
DAZOMET	5.90	7.08	6.84	6.61
PERMETH	5.83	5.97	6.50	6.10
PHORATE	6.02	6.28	6.17	6.16
PIRIMICA	6.60	6.57	7.25	6.81
BE/DA/PH	6.74	6.86	7.36	6.99
MEAN	6.14	6.40	6.76	6.44

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

TABLE	CHEMICAL	N	CHEMICAL N	
SED	0.370		0.528	MIN REP
	0.321	0.153	0.457	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CHEMICAL			0.460	MIN REP
			0.326	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	17	0.454	7.0
BLOCK.WP.SP	38	0.564	8.8

GRAIN MEAN DM% 20.6

SUB PLOT AREA HARVESTED 0.00059

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79/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 sixth year, barley.

For previous years see 74-78/R/CS/140.

Design: 32 plots fully randomised.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively 1974-79 except WEEDKLLR - 1974 and 76 only: All combinations of:-

1. FUNGCIDE	Fungicide:
NONE	None
BENOMYL	Benomyl at 4 kg
2. INSCTCDE	Insecticide:
NONE	None
CHLORFEN	Chlorfenvinphos at 2 kg
3. NEMACIDE	Nematicide:
NONE	None
ALDICARB	Aldicarb at 6 kg
4. WEEDKLLR	Weedkiller:
NONE	None
CHLORTOL	Chlortoluron at 2 kg applied 1974 and 1976 only

NOTE: Chemicals were applied to the seedbed on 6 Apr, 1979.

Basal applications: Manures: Chalk at 2.9 t, 'Nitro-Chalk' at 450 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 340 l.

Seed: Porthos (undressed), sown at 160 kg.

Cultivations: Chalk applied: 31 Oct, 1978. Ploughed: 22 Jan, 1979. N applied: 5 Apr. Power harrowed, seed sown: 17 Apr. Weedkillers applied: 30 May. Combine harvested: 28 Aug.

NOTES: (1) Observations were made on the incidence of aphids and mildew. Amounts of chlorfenvinphos and benomyl in plants were measured during the season.

(2) The yields were adjusted for a fertility difference between the North and South halves of the experimental area.

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79/R/CS/140

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE			
NONE	4.70	4.62	4.66
BENOMYL	4.56	4.60	4.58
MEAN	4.63	4.61	4.62

NEMACIDE	NONE	ALDICARB	MEAN
FUNGCIDE			
NONE	4.53	4.79	4.66
BENOMYL	4.65	4.51	4.58
MEAN	4.59	4.65	4.62

NEMACIDE	NONE	ALDICARB	MEAN
INSCTCDE			
NONE	4.48	4.78	4.63
CHLORFEN	4.70	4.52	4.61
MEAN	4.59	4.65	4.62

WEEDKLLR	NONE	CHLORTOL	MEAN
FUNGCIDE			
NONE	4.59	4.72	4.66
BENOMYL	4.61	4.55	4.58
MEAN	4.60	4.64	4.62

WEEDKLLR	NONE	CHLORTOL	MEAN
INSCTCDE			
NONE	4.66	4.60	4.63
CHLORFEN	4.54	4.68	4.61
MEAN	4.60	4.64	4.62

WEEDKLLR	NONE	CHLORTOL	MEAN
NEMACIDE			
NONE	4.54	4.64	4.59
ALDICARB	4.66	4.64	4.65
MEAN	4.60	4.64	4.62

	NEMACIDE	NONE	ALDICARB
FUNGCIDE	INSCTCDE		
NONE	NONE	4.44	4.95
	CHLORFEN	4.61	4.62
BENOMYL	NONE	4.51	4.61
	CHLORFEN	4.78	4.41

	WEEDKLLR	NONE	CHLORTOL
FUNGCIDE	INSCTCDE		
NONE	NONE	4.76	4.64
	CHLORFEN	4.43	4.80
BENOMYL	NONE	4.57	4.55
	CHLORFEN	4.64	4.56

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79/R/CS/140

GRAIN TONNES/HECTARE

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

	WEEDKLLR	NONE	CHLORTOL
FUNGCIDE	NEMACIDE		
NONE	NONE	4.55	4.50
	ALDICARB	4.64	4.94
BENOMYL	NONE	4.52	4.77
	ALDICARB	4.69	4.34

	WEEDKLLR	NONE	CHLORTOL
INSCTCDE	NEMACIDE		
NONE	NONE	4.57	4.38
	ALDICARB	4.75	4.81
CHLORFEN	NONE	4.50	4.89
	ALDICARB	4.57	4.46

	NEMACIDE	NONE		ALDICARB	
	WEEDKLLR	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE	INSCTCDE				
NONE	NONE	4.68	4.20	4.83	5.08
	CHLORFEN	4.42	4.80	4.44	4.80
BENOMYL	NONE	4.46	4.56	4.68	4.54
	CHLORFEN	4.59	4.98	4.70	4.13

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

TABLE	FUNGCIDE	INSCTCDE	NEMACIDE	WEEDKLLR
SED	0.165	0.172	0.162	0.165

TABLE	FUNGCIDE INSCTCDE	FUNGCIDE NEMACIDE	INSCTCDE NEMACIDE	FUNGCIDE WEEDKLLR
SED	0.237	0.232	0.239	0.237

TABLE	INSCTCDE WEEDKLLR	NEMACIDE WEEDKLLR	FUNGCIDE INSCTCDE NEMACIDE	FUNGCIDE INSCTCDE WEEDKLLR
SED	0.246	0.232	0.333	0.342

TABLE	FUNGCIDE NEMACIDE WEEDKLLR	INSCTCDE NEMACIDE WEEDKLLR	FUNGCIDE INSCTCDE NEMACIDE WEEDKLLR
SED	0.330	0.339	0.474

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

STRATUM	DF	SE	CV%
WP	15	0.459	9.9

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00075

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79/R/CS/156

LEATHERJACKET STUDY

Object: To study the effects of protection from bird predation on leatherjacket populations and yield of old grass - Road Piece.

Sponsors: J. Bowden, J.R. Lofty.

The fifth year, old grass.

For previous years see 75-78/R/CS/156.

Design: 3 blocks of 6 plots.

Whole plot dimensions: 2.74 x 3.66.

Treatments:

TREATMNT		
NONE	No protection (duplicated)	
NET E	Covered by bird-proof netting	16 Nov, 1978 - 29 Jan, 1979
NET L	" " " " "	19 Feb - 17 May
NET EL	" " " " "	16 Nov - 17 May
NET EL G	" " " " " at ground level	16 Nov - 17 May but with a gap

Basal applications: Manures: (0:14:28) at 500 kg. (25:0:16) at 440 kg in spring and 220 kg after the second cut.

Cultivations, etc.:- PK applied: 16 Nov, 1978. NK applied: 5 Mar, 1979. Cut three times: 31 May, 24 July, 28 Sept. NK applied: 13 June, 24 July.

NOTE: The plots were sampled for leatherjackets several times during the season.

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79/R/CS/156

1ST CUT (31/5/79) DRY MATTER TONNES/HECTARE

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

TREATMNT	NONE	NET E	NET L	NET EL	NET EL G	MEAN
	4.18	3.72	4.19	4.54	4.33	4.19

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

TABLE	TREATMNT	
SED	0.277	MIN REP
	0.240	MAX-MIN

	TREATMNT
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	11	0.339	8.1

1ST CUT MEAN DM% 15.6

2ND CUT (24/7/79) DRY MATTER TONNES/HECTARE

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

TREATMNT	NONE	NET E	NET L	NET EL	NET EL G	MEAN
	2.28	2.20	2.23	1.98	2.10	2.18

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

TABLE	TREATMNT	
SED	0.321	MIN REP
	0.278	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.393	18.1

2ND CUT MEAN DM% 20.0

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79/R/CS/156

3RD CUT (28/9/79) DRY MATTER TONNES/HECTARE

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

TREATMNT	NONE	NET E	NET L	NET EL	NET EL G	MEAN
	2.34	2.64	2.60	2.42	2.16	2.42

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

TABLE	TREATMNT	
SED	0.160	MIN REP
	0.139	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.196	8.1

3RD CUT MEAN DM% 24.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	NONE	NET E	NET L	NET EL	NET EL G	MEAN
	8.80	8.56	9.02	8.94	8.58	8.78

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

TABLE	TREATMNT	
SED	0.631	MIN REP
	0.546	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.772	8.8

TOTAL OF 3 CUTS MEAN DM% 20.0

PLOT AREA HARVESTED 0.00037

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79/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 fifth year, old grass.

For previous years see 76-78/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 and 1978)

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+6+8+9 — 1975, 1976, 1978 and 1979
   75+6+7+8 — 1975, 1976, 1977 and 1978

plus six whole plots given 'Nitro-Chalk', dressing divided between cuts (kg N, total/annum):

SOLID N

 0
100
200
300
400
500

with sub plots YEARS as above.

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79/R/CS/161

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.

Basal applications: (0:14:28) at 1010 kg.

Cultivations, etc.:- PK applied: 15 Nov, 1978. Aqueous urea and inhibitors injected: 3 Apr, 1979. Solid N applied six times: 3 Apr, 11 May, 7 June, 11 July, 13 Aug and 10 Sept. Cut: 10 May, 6 June, 10 July, 10 Aug, 7 Sept, and 24 Oct.

NOTE: The subsoil was tested for N content before injecting and topsoil was tested weekly throughout the season for ammonium and nitrate content.

1ST CUT (10/5/79) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	1.02	0.96	0.99
UREA+INH	1.00	0.97	0.98
MEAN	1.01	0.96	0.99

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.81	1.00	1.16	0.99
UREA+INH	0.85	0.89	1.21	0.98
MEAN	0.83	0.94	1.18	0.99

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.93	0.96	1.15	1.01
60 CM	0.74	0.93	1.21	0.96
MEAN	0.83	0.94	1.18	0.99

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	1.42	0.56	0.99
UREA+INH	1.39	0.58	0.98
MEAN	1.41	0.57	0.99

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	1.59	0.43	1.01
60 CM	1.22	0.70	0.96
MEAN	1.41	0.57	0.99

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79/R/CS/161

1ST CUT (10/5/79) DRY MATTER TONNES/HECTARE

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

YEARS	75+6+8+9	75+6+7+8	MEAN
N RATE			
250	1.23	0.44	0.83
375	1.39	0.50	0.94
500	1.60	0.77	1.18
MEAN	1.41	0.57	0.99

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.93	0.96	1.18	0.69	1.03	1.14
UREA+INH	0.92	0.96	1.13	0.79	0.82	1.29

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	1.61	0.43	1.23	0.68
UREA+INH	1.57	0.43	1.20	0.73

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	1.22	0.41	1.49	0.50	1.56	0.76
UREA+INH	1.24	0.47	1.28	0.50	1.65	0.77

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	1.49	0.36	1.53	0.39	1.76	0.55
60 CM	0.96	0.52	1.25	0.61	1.44	0.99

	N RATE	250		375		500	
	YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	1.49	0.38	1.58	0.35	1.78	0.57
	60 CM	0.94	0.44	1.41	0.65	1.34	0.94
UREA+INH	30 CM	1.49	0.35	1.48	0.43	1.75	0.52
	60 CM	0.98	0.59	1.09	0.56	1.54	1.03

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		0.55	0.82	1.21	1.60	1.55	1.15
75+6+7+8		0.26	0.42	0.69	0.40	0.56	0.47
MEAN	0.36	0.41	0.62	0.95	1.00	1.05	0.73

GRAND MEAN 0.90

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79/R/CS/161

1ST CUT (10/5/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.130	0.053	0.053	0.065

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.036 0.056*	0.075	0.092	0.092

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.157	0.064	0.064	0.078
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.124			
LIQUID N		0.051		
SPACING			0.051	
N RATE				0.062

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.130	0.091	0.111	0.111
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.072		
LIQUID N.N RATE			0.088	
SPACING N RATE				0.088

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.157
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.124

* USE ONLY IN TABLES INVOLVING SOLID N

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.130	14.4
BLOCK.WP.SP	19	0.124	13.8

1ST CUT MEAN DM% 24.3

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79/R/CS/161

2ND CUT (6/6/79) DRY MATTER TONNES/HECTARE

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

SPACING LIQUID N	30 CM	60 CM	MEAN
UREA	3.13	3.05	3.09
UREA+INH	2.99	3.11	3.05
MEAN	3.06	3.08	3.07

N RATE LIQUID N	250	375	500	MEAN
UREA	2.88	3.09	3.29	3.09
UREA+INH	2.92	2.92	3.33	3.05
MEAN	2.90	3.00	3.31	3.07

N RATE SPACING	250	375	500	MEAN
30 CM	2.93	2.99	3.26	3.06
60 CM	2.87	3.01	3.36	3.08
MEAN	2.90	3.00	3.31	3.07

YEARS LIQUID N	75+6+8+9	75+6+7+8	MEAN
UREA	3.90	2.28	3.09
UREA+INH	3.87	2.24	3.05
MEAN	3.88	2.26	3.07

YEARS SPACING	75+6+8+9	75+6+7+8	MEAN
30 CM	4.07	2.06	3.06
60 CM	3.70	2.46	3.08
MEAN	3.88	2.26	3.07

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79/R/CS/161

2ND CUT (6/6/79) DRY MATTER TONNES/HECTARE

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

YEARS	75+6+8+9	75+6+7+8	MEAN
N RATE			
250	3.84	1.96	2.90
375	3.93	2.07	3.00
500	3.88	2.74	3.31
MEAN	3.88	2.26	3.07

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	3.00	3.07	3.33	2.77	3.11	3.26
UREA+INH	2.87	2.92	3.20	2.96	2.92	3.46

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	4.13	2.13	3.67	2.43
UREA+INH	4.00	1.99	3.73	2.49

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	3.76	2.01	4.04	2.13	3.90	2.69
UREA+INH	3.92	1.91	3.82	2.01	3.86	2.79

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	4.01	1.86	4.13	1.85	4.06	2.47
60 CM	3.67	2.07	3.74	2.29	3.70	3.02

N RATE		250		375		500	
YEARS		75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	3.94	2.05	4.34	1.80	4.11	2.54
	60 CM	3.57	1.97	3.75	2.47	3.68	2.84
UREA+INH	30 CM	4.08	1.66	3.92	1.91	4.00	2.39
	60 CM	3.76	2.16	3.72	2.12	3.72	3.20

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		2.48	2.98	3.01	3.46	3.66	3.12
75+6+7+8		1.53	1.71	2.09	1.73	2.16	1.84
MEAN	2.36	2.01	2.34	2.55	2.60	2.91	2.46

GRAND MEAN 2.87

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79/R/CS/161

2ND CUT (6/6/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.184	0.075	0.075	0.092

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.065 0.101*	0.106	0.130	0.130

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.243	0.099	0.099	0.121
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.224			
LIQUID N		0.091		
SPACING			0.091	
N RATE				0.112

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.184	0.140	0.172	0.172
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.129		
LIQUID N.N RATE			0.158	
SPACING N RATE				0.158

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.243
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.224

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.184	6.4
BLOCK.WP.SP	19	0.224	7.8

2ND CUT MEAN% 17.3

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79/R/CS/161

3RD CUT (10/7/79) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	1.19	1.29	1.24
UREA+INH	1.16	1.27	1.22
MEAN	1.18	1.28	1.23

N RATE	250	375	500	MEAN
LIQUID N				
UREA	1.26	1.21	1.26	1.24
UREA+INH	1.25	1.25	1.15	1.22
MEAN	1.25	1.23	1.21	1.23

N RATE	250	375	500	MEAN
SPACING				
30 CM	1.21	1.21	1.11	1.18
60 CM	1.30	1.24	1.31	1.28
MEAN	1.25	1.23	1.21	1.23

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	1.55	0.93	1.24
UREA+INH	1.52	0.91	1.22
MEAN	1.53	0.92	1.23

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	1.44	0.92	1.18
60 CM	1.63	0.93	1.28
MEAN	1.53	0.92	1.23

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79/R/CS/161

3RD CUT (10/7/79) DRY MATTER TONNES/HECTARE

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

YEARS N RATE	75+6+8+9	75+6+7+8	MEAN
250	1.53	0.98	1.25
375	1.56	0.90	1.23
500	1.52	0.90	1.21
MEAN	1.53	0.92	1.23

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	1.23	1.20	1.16	1.29	1.21	1.37
UREA+INH	1.19	1.23	1.06	1.31	1.27	1.24

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	1.48	0.91	1.62	0.96
UREA+INH	1.40	0.92	1.64	0.91

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	1.60	0.92	1.52	0.89	1.53	0.99
UREA+INH	1.46	1.04	1.60	0.90	1.50	0.80

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	1.38	1.04	1.53	0.89	1.40	0.82
60 CM	1.67	0.92	1.59	0.90	1.63	0.98

	N RATE	250		375		500	
	YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	1.46	0.99	1.55	0.85	1.43	0.88
	60 CM	1.73	0.84	1.48	0.94	1.63	1.10
UREA+INH	30 CM	1.30	1.08	1.51	0.94	1.37	0.75
	60 CM	1.61	1.01	1.69	0.85	1.63	0.85

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		1.24	1.21	1.51	1.47	1.45	1.38
75+6+7+8		0.79	0.85	0.78	0.76	0.91	0.82
MEAN	1.25	1.01	1.03	1.15	1.11	1.18	1.12

GRAND MEAN 1.19

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79/R/CS/161

3RD CUT (10/7/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.132	0.054	0.054	0.066

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.053 0.082*	0.076	0.093	0.093

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.185	0.075	0.075	0.092
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.182			
LIQUID N		0.074		
SPACING			0.074	
N RATE				0.091

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.132	0.107	0.131	0.131
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.105		
LIQUID N.N RATE			0.129	
SPACING N RATE				0.129

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.185
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.182

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.132	11.1
BLOCK.WP.SP	19	0.182	15.3

3RD CUT MEAN DM% 23.4

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79/R/CS/161

4TH CUT (10/8/79) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	0.58	0.50	0.54
UREA+INH	0.45	0.50	0.48
MEAN	0.52	0.50	0.51

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.46	0.53	0.63	0.54
UREA+INH	0.50	0.46	0.47	0.48
MEAN	0.48	0.49	0.55	0.51

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.44	0.51	0.60	0.52
60 CM	0.51	0.48	0.50	0.50
MEAN	0.48	0.49	0.55	0.51

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	0.82	0.26	0.54
UREA+INH	0.66	0.29	0.48
MEAN	0.74	0.27	0.51

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	0.75	0.29	0.52
60 CM	0.74	0.26	0.50
MEAN	0.74	0.27	0.51

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4TH CUT (10/8/79) DRY MATTER TONNES/HECTARE

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

YEARS N RATE	75+6+8+9	75+6+7+8	MEAN
250	0.61	0.34	0.48
375	0.77	0.22	0.49
500	0.84	0.26	0.55
MEAN	0.74	0.27	0.51

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.42	0.57	0.76	0.49	0.48	0.51
UREA+INH	0.46	0.44	0.45	0.53	0.48	0.49

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	0.90	0.27	0.74	0.25
UREA+INH	0.60	0.31	0.73	0.27

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	0.60	0.32	0.83	0.22	1.03	0.24
UREA+INH	0.63	0.36	0.70	0.22	0.66	0.28

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	0.49	0.39	0.78	0.24	0.98	0.23
60 CM	0.74	0.29	0.76	0.20	0.71	0.29

N RATE		250		375		500	
YEARS		75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	0.48	0.36	0.92	0.22	1.29	0.22
	60 CM	0.71	0.28	0.74	0.22	0.76	0.27
UREA+INH	30 CM	0.49	0.43	0.63	0.25	0.66	0.24
	60 CM	0.77	0.30	0.78	0.18	0.65	0.32

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		0.65	0.56	0.58	0.59	1.05	0.69
75+6+7+8		0.33	0.28	0.22	0.15	0.24	0.24
MEAN	0.62	0.49	0.42	0.40	0.37	0.65	0.49

GRAND MEAN 0.50

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79/R/CS/161

4TH CUT (10/8/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.097	0.040	0.040	0.049

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.038 0.059*	0.056	0.069	0.069

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.135	0.055	0.055	0.067
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.133			
LIQUID N		0.054		
SPACING			0.054	
N RATE				0.066

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.097	0.078	0.095	0.095
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.078		
LIQUID N.N RATE			0.094	
SPACING N RATE				0.094

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.135
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.133

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.097	19.3
BLOCK.WP.SP	19	0.133	26.4

4TH CUT MEAN DM% 27.1

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79/R/CS/161

5TH CUT (7/9/79) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	1.07	1.02	1.04
UREA+INH	0.95	1.05	1.00
MEAN	1.01	1.03	1.02

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.85	1.02	1.26	1.04
UREA+INH	0.95	0.91	1.13	1.00
MEAN	0.90	0.97	1.20	1.02

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.88	0.93	1.22	1.01
60 CM	0.92	1.01	1.17	1.03
MEAN	0.90	0.97	1.20	1.02

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	1.49	0.60	1.04
UREA+INH	1.44	0.56	1.00
MEAN	1.46	0.58	1.02

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	1.42	0.60	1.01
60 CM	1.50	0.56	1.03
MEAN	1.46	0.58	1.02

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79/R/CS/161

5TH CUT (7/9/79) DRY MATTER TONNES/HECTARE

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

YEARS	75+6+8+9	75+6+7+8	MEAN
N RATE			
250	1.06	0.74	0.90
375	1.47	0.47	0.97
500	1.86	0.53	1.20
MEAN	1.46	0.58	1.02

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.85	1.04	1.33	0.84	1.01	1.19
UREA+INH	0.91	0.82	1.12	0.99	1.01	1.15

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	1.51	0.63	1.47	0.56
UREA+INH	1.33	0.57	1.54	0.56

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	0.98	0.71	1.56	0.49	1.93	0.59
UREA+INH	1.13	0.76	1.38	0.45	1.79	0.48

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	0.89	0.86	1.37	0.49	2.00	0.44
60 CM	1.22	0.61	1.57	0.45	1.72	0.62

N RATE		250		375		500	
YEARS		75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	0.88	0.83	1.51	0.56	2.16	0.50
	60 CM	1.09	0.60	1.60	0.41	1.71	0.67
UREA+INH	30 CM	0.91	0.90	1.23	0.41	1.85	0.39
	60 CM	1.36	0.62	1.53	0.49	1.74	0.57

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		1.41	1.93	2.22	2.26	2.20	2.00
75+6+7+8		0.85	0.72	0.50	0.30	0.46	0.57
MEAN	1.04	1.13	1.33	1.36	1.28	1.33	1.24

GRAND MEAN 1.10

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79/R/CS/161

5TH CUT (7/9/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.121	0.049	0.049	0.061

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.052 0.081*	0.069	0.085	0.085

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.176	0.072	0.072	0.088
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.181			
LIQUID N		0.074		
SPACING			0.074	
N RATE				0.091

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.121	0.102	0.125	0.125
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.105		
LIQUID N.N RATE			0.128	
SPACING N RATE				0.128

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.176
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.181

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.121	11.1
BLOCK.WP.SP	19	0.181	16.5

5TH CUT MEAN DM% 24.3

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79/R/CS/161

6TH CUT (24/10/79) DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	0.22	0.30	0.26
UREA+INH	0.22	0.28	0.25
MEAN	0.22	0.29	0.25

N RATE	250	375	500	MEAN
LIQUID N				
UREA	0.21	0.26	0.31	0.26
UREA+INH	0.22	0.26	0.27	0.25
MEAN	0.22	0.26	0.29	0.25

N RATE	250	375	500	MEAN
SPACING				
30 CM	0.19	0.21	0.25	0.22
60 CM	0.24	0.30	0.33	0.29
MEAN	0.22	0.26	0.29	0.25

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	0.33	0.19	0.26
UREA+INH	0.32	0.18	0.25
MEAN	0.32	0.19	0.25

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	0.25	0.19	0.22
60 CM	0.40	0.18	0.29
MEAN	0.32	0.19	0.25

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79/R/CS/161

6TH CUT (24/10/79) DRY MATTER TONNES/HECTARE

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

YEARS N RATE	75+6+8+9	75+6+7+8	MEAN
250	0.22	0.21	0.22
375	0.32	0.19	0.26
500	0.42	0.16	0.29
MEAN	0.32	0.19	0.25

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	0.17	0.23	0.26	0.25	0.29	0.37
UREA+INH	0.22	0.19	0.24	0.23	0.32	0.29

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	0.25	0.19	0.41	0.19
UREA+INH	0.24	0.19	0.39	0.18

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	0.20	0.22	0.32	0.19	0.46	0.17
UREA+INH	0.25	0.20	0.32	0.19	0.38	0.16

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	0.18	0.21	0.20	0.22	0.36	0.15
60 CM	0.27	0.21	0.44	0.17	0.49	0.17

N RATE		250		375		500	
YEARS		75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	0.14	0.20	0.22	0.24	0.38	0.14
	60 CM	0.26	0.24	0.43	0.15	0.55	0.19
UREA+INH	30 CM	0.22	0.22	0.19	0.20	0.33	0.15
	60 CM	0.28	0.18	0.45	0.19	0.43	0.16

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		0.39	0.41	0.38	0.49	0.57	0.45
75+6+7+8		0.21	0.22	0.12	0.14	0.20	0.18
MEAN	0.16	0.30	0.32	0.25	0.32	0.38	0.29

GRAND MEAN 0.27

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6TH CUT (24/10/79) DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.053	0.022	0.022	0.027

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.025 0.038*	0.031	0.037	0.037

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.081	0.033	0.033	0.040
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.086			
LIQUID N		0.035		
SPACING			0.035	
N RATE				0.043

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.053	0.047	0.057	0.057
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.050		
LIQUID N.N RATE			0.061	
SPACING N RATE				0.061

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.081
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.086

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.053	20.0
BLOCK.WP.SP	19	0.086	32.2

6TH CUT MEAN DM% 26.2

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TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

SPACING	30 CM	60 CM	MEAN
LIQUID N			
UREA	7.22	7.10	7.16
UREA+INH	6.77	7.19	6.98
MEAN	7.00	7.14	7.07

N RATE	250	375	500	MEAN
LIQUID N				
UREA	6.47	7.10	7.92	7.16
UREA+INH	6.69	6.69	7.56	6.98
MEAN	6.58	6.89	7.74	7.07

N RATE	250	375	500	MEAN
SPACING				
30 CM	6.58	6.81	7.60	7.00
60 CM	6.57	6.98	7.88	7.14
MEAN	6.58	6.89	7.74	7.07

YEARS	75+6+8+9	75+6+7+8	MEAN
LIQUID N			
UREA	9.51	4.82	7.16
UREA+INH	9.19	4.77	6.98
MEAN	9.35	4.79	7.07

YEARS	75+6+8+9	75+6+7+8	MEAN
SPACING			
30 CM	9.51	4.48	7.00
60 CM	9.19	5.10	7.14
MEAN	9.35	4.79	7.07

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TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

YEARS	75+6+8+9	75+6+7+8	MEAN
N RATE			
250	8.49	4.67	6.58
375	9.44	4.35	6.89
500	10.13	5.36	7.74
MEAN	9.35	4.79	7.07

SPACING	30 CM			60 CM		
N RATE	250	375	500	250	375	500
LIQUID N						
UREA	6.59	7.07	8.00	6.34	7.13	7.85
UREA+INH	6.56	6.55	7.20	6.81	6.82	7.92

SPACING	30 CM		60 CM	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N				
UREA	9.88	4.56	9.13	5.07
UREA+INH	9.14	4.40	9.24	5.13

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N						
UREA	8.35	4.58	9.77	4.43	10.41	5.44
UREA+INH	8.62	4.75	9.11	4.27	9.84	5.29

N RATE	250		375		500	
YEARS	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
SPACING						
30 CM	8.44	4.72	9.54	4.08	10.55	4.65
60 CM	8.53	4.61	9.34	4.62	9.70	6.07

N RATE		250		375		500	
YEARS		75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8	75+6+8+9	75+6+7+8
LIQUID N	SPACING						
UREA	30 CM	8.39	4.80	10.12	4.01	11.14	4.86
	60 CM	8.31	4.37	9.41	4.85	9.68	6.01
UREA+INH	30 CM	8.49	4.63	8.97	4.14	9.97	4.44
	60 CM	8.76	4.86	9.26	4.39	9.71	6.13

SOLID N	0	100	200	300	400	500	MEAN
YEARS							
75+6+8+9		6.72	7.91	8.90	9.88	10.48	8.78
75+6+7+8		3.99	4.21	4.40	3.47	4.52	4.12
MEAN	5.80	5.35	6.06	6.65	6.67	7.50	6.34

GRAND MEAN 6.83

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79/R/CS/161

TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

TABLE	SOLID N	LIQUID N	SPACING	N RATE
SED	0.417	0.170	0.170	0.209

TABLE	YEARS	LIQUID N SPACING	LIQUID N N RATE	SPACING N RATE
SED	0.147 0.228*	0.241	0.295	0.295

TABLE	SOLID N YEARS	LIQUID N YEARS	SPACING YEARS	N RATE YEARS
SED	0.551	0.225	0.225	0.275
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOLID N	0.508			
LIQUID N		0.207		
SPACING			0.207	
N RATE				0.254

TABLE	LIQUID N SPACING N RATE	LIQUID N SPACING YEARS	LIQUID N N RATE YEARS	SPACING N RATE YEARS
SED	0.417	0.318	0.389	0.389
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
LIQUID N.SPACING		0.293		
LIQUID N.N RATE			0.359	
SPACING N RATE				0.359

TABLE	LIQUID N SPACING N RATE YEARS
SED	0.551
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
LIQUID N.SPACING.N RATE	0.508

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.417	6.1
BLOCK.WP.SP	19	0.508	7.4

TOTAL OF 6 CUTS MEAN DM% 23.8

SUBPLOT AREA HARVESTED 0.00141

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79/R/CS/165

SCLEROTINIA CONTROL

Object: To study the effects of two fungicides and paraquat on the incidence of Sclerotinia and on yield of red and white clover - Little Knott I.

Sponsor: J.F. Jenkyn.

The second year of treatments, red and white clover.

For previous year see 78/R/CS/165.

Design: 2 randomised blocks of 30 plots.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. VARIETY — Varieties and their resistance to Sclerotinia trifoliorum:

BLANC WR	Blanca, white clover, resistant
SABED WS	Sabeda, white clover, susceptible
HUNGA RR	Hungaropoly, red clover, resistant
SABTO RS	Sabtoron, red clover, susceptible

2. TREATMNT — Chemical sprays and timing (cumulative to 1978 treatments):

NONE	None
IPROD E	Iprodione early period, 6 Oct, 1978 and 30 Oct
IPROD M	Iprodione mid period, 30 Oct and 29 Nov
IPROD L	Iprodione late period, 29 Nov and 8 Jan, 1979
IPROD A	Iprodione all periods, 6 Oct, 30 Oct, 29 Nov, 8 Jan, 5 Feb
BENOMY A	Benomyl all periods, 6 Oct, 30 Oct, 29 Nov, 1978, 8 Jan, 1979 5 Feb
PARAQ W	Paraquat in winter, 29 Nov, 1978

plus two extra treatments (cumulative to 1978 treatments):

EXTRA

SABED PS	Sabeda, sprayed paraquat in spring, 10 Apr, 1979
SABTO PS	Sabtoron, sprayed paraquat in spring, 10 Apr

NOTE: Chemical treatments applied as follows:-
Iprodione at 0.50 kg in 340 l. Benomyl at 0.50 kg in 340 l (both applied with 'Spreadite', a wetting agent, at 0.25 kg). Paraquat at 0.56 kg ion in 340 l on the first occasion and at 0.28 kg ion in 340 l on the second.

Basal applications: Manures: (0:14:28) at 540 kg.

Cultivations, etc.:- PK applied: 5 Mar, 1979. Cut three times: 13 June, 2 Aug, 18 Sept.

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79/R/CS/165

1ST CUT (13/6/79) DRY MATTER TONNES/HECTARE

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

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	3.84	3.20	6.02	5.73	4.70
IPROD E	3.41	3.10	6.48	5.08	4.52
IPROD M	4.30	3.35	6.78	5.33	4.94
IPROD L	3.44	3.02	6.59	5.63	4.67
IPROD A	3.46	3.70	6.31	5.63	4.78
BENOMY A	4.64	4.77	6.69	6.29	5.60
PARAQ W	3.54	3.30	6.11	3.39	4.09
MEAN	3.81	3.49	6.43	5.30	4.75

EXTRA	SABED PS	SABTO PS	MEAN
	2.51	4.28	3.40

GRAND MEAN 4.66

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

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.537	0.268	0.203	0.537

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.537	11.5

1ST CUT MEAN DM% 12.1

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79/R/CS/165

2ND CUT (2/8/79) DRY MATTER TONNES/HECTARE

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

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	2.20	2.07	4.28	3.29	2.96
IPROD E	2.13	1.97	4.94	3.27	3.07
IPROD M	2.43	2.11	4.97	3.91	3.36
IPROD L	2.21	2.00	4.51	3.32	3.01
IPROD A	2.57	2.64	4.69	3.45	3.34
BENOMY A	2.52	2.09	4.12	4.40	3.28
PARAQ W	1.79	2.34	4.32	3.03	2.87
MEAN	2.26	2.17	4.55	3.52	3.13

EXTRA	SABED PS	SABTO PS	MEAN
	2.10	3.51	2.81

GRAND MEAN 3.11

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

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.330	0.165	0.125	0.330

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.330	10.6

2ND CUT MEAN DM% 24.3

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79/R/CS/165

3RD CUT (18/9/79) DRY MATTER TONNES/HECTARE

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

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	1.74	1.49	1.72	0.89	1.46
IPROD E	0.95	1.28	1.64	0.87	1.18
IPROD M	1.91	1.29	1.74	1.07	1.50
IPROD L	1.04	0.90	1.76	1.00	1.18
IPROD A	1.28	1.51	1.80	0.85	1.36
BENOMY A	1.00	1.23	1.76	1.72	1.43
PARAQ W	1.01	1.20	1.72	0.85	1.19
MEAN	1.27	1.27	1.74	1.04	1.33

EXTRA	SABED PS	SABTO PS	MEAN
	1.47	0.80	1.13

GRAND MEAN 1.32

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

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.242	0.121	0.091	0.242

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.242	18.4

3RD CUT MEAN DM% 23.1

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79/R/CS/165

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	7.78	6.76	12.01	9.91	9.12
IPROD E	6.48	6.34	13.06	9.23	8.78
IPROD M	8.64	6.74	13.50	10.31	9.80
IPROD L	6.68	5.93	12.87	9.95	8.86
IPROD A	7.32	7.85	12.80	9.93	9.47
BENOMY A	8.16	8.09	12.57	12.41	10.31
PARAQ W	6.33	6.83	12.15	7.27	8.15
MEAN	7.34	6.93	12.71	9.86	9.21

EXTRA	SABED PS	SABTO PS	MEAN
	6.08	8.59	7.33

GRAND MEAN 9.09

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

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.694	0.347	0.262	0.694

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.694	7.6

TOTAL OF 3 CUTS MEAN DM% 19.8

PLOT AREA HARVESTED 0.00028

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79/W/CS/174

SOWING DATES AND CCN

Object: To study the residual effects of sowing date, a nematicide, a soil sterilant and previous cropping on the incidence of cereal cyst-nematode (Heterodera avenae) (CCN) and on the yield of oats in a soil known to contain a fungal parasite of the nematode - Woburn, Butt Close.

Sponsor: B.R. Kerry.

The fifth year, oats.

For previous years see 75/W/M/1 and 76-78/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(78) Nematicide (cumulative 1975-78):

   NONE None
   OXAMYL Oxamyl at 8.8 kg

4. CROP(78) Crop in 1977 & 1978 (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 & 1978 only. To SOW DATE AUTUMN in 1977 only.

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79/W/CS/174

Basal applications: Manures: Magnesian limestone at 7.5 t. (20:14:14) at 400 kg combine drilled. Weedkillers: Diquat at 0.78 kg ion in 280 l. Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 kg in 340 l). Irrigation (mm water):

13 June	25
22 June	7
28 June	6
5-6 July	25
13 July	25
18 July	25
26 July	25
Total	138

Seed: Manod, sown at 200 kg.

Cultivations, etc.:- Diquat applied: 8 Sept, 1978. Subsoiled, tines 55 cm deep, 140 cm apart: 20 Oct. Magnesian limestone applied: 19 Dec. Ploughed: 5 Mar, 1979. Spring-tine cultivated with crumbler attached: 16 Apr. Seed sown: 23 Apr. 'Brittox' applied: 1 June. Combine harvested: 1 Sept.

NOTES: (1) Soil samples were taken in April for pre-sowing estimates of Heterodera avenae cysts and eggs, in July for estimates of unhatched cysts and in September for post-harvest estimates of cysts and eggs.

(2) Plant samples were taken at weekly intervals from 27 June to 31 August for estimates of numbers of H. avenae females infected by parasitic fungi.

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79/W/CS/174

GRAIN TONNES/HECTARE

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

SOW DATE(76)	AUTUMN	SPRING	MEAN
CROP(76)			
WHEAT	3.01	3.11	3.06
BARLEY	2.71	2.99	2.85
OATS	2.52	2.97	2.75
MEAN	2.75	3.02	2.89

NEMACIDE(78)	NONE	OXAMYL	MEAN
CROP(76)			
WHEAT	2.25	3.87	3.06
BARLEY	1.97	3.72	2.85
OATS	2.07	3.43	2.75
MEAN	2.10	3.67	2.89

NEMACIDE(78)	NONE	OXAMYL	MEAN
SOW DATE(76)			
AUTUMN	2.05	3.45	2.75
SPRING	2.15	3.90	3.02
MEAN	2.10	3.67	2.89

CROP(78)	WHEAT	BARLEY	OATS	MEAN
CROP(76)				
WHEAT	3.04	3.34	2.81	3.06
BARLEY	2.90	2.66	2.97	2.85
OATS	2.76	2.88	2.60	2.75
MEAN	2.90	2.96	2.80	2.89

CROP(78)	WHEAT	BARLEY	OATS	MEAN
SOW DATE(76)				
AUTUMN	2.80	2.85	2.60	2.75
SPRING	3.00	3.07	2.99	3.02
MEAN	2.90	2.96	2.80	2.89

CROP(78)	WHEAT	BARLEY	OATS	MEAN
NEMACIDE(78)				
NONE	1.91	2.18	2.20	2.10
OXAMYL	3.89	3.74	3.39	3.67
MEAN	2.90	2.96	2.80	2.89

STERILNT	NONE	FORMALIN	MEAN
CROP(76)			
WHEAT	3.18	2.94	3.06
BARLEY	2.88	2.81	2.85
OATS	2.93	2.57	2.75
MEAN	3.00	2.77	2.89

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GRAIN TONNES/HECTARE

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

STERILNT SOW DATE(76)	NONE	FORMALIN	MEAN
AUTUMN	2.93	2.57	2.75
SPRING	3.06	2.98	3.02
MEAN	3.00	2.77	2.89

STERILNT NEMACIDE(78)	NONE	FORMALIN	MEAN
NONE	2.32	1.88	2.10
OXAMYL	3.68	3.67	3.67
MEAN	3.00	2.77	2.89

STERILNT CROP(78)	NONE	FORMALIN	MEAN
WHEAT	3.00	2.80	2.90
BARLEY	3.02	2.90	2.96
OATS	2.97	2.62	2.80
MEAN	3.00	2.77	2.89

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	2.16	3.87	2.34	3.88
BARLEY	1.82	3.59	2.12	3.85
OATS	2.16	2.88	1.98	3.97

SOW DATE(76)	AUTUMN			SPRING		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	3.22	3.42	2.40	2.86	3.26	3.21
BARLEY	2.66	2.49	2.97	3.14	2.84	2.98
OATS	2.51	2.64	2.42	3.00	3.13	2.79

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	2.05	2.48	2.22	4.03	4.19	3.40
BARLEY	1.99	1.66	2.26	3.81	3.67	3.69
OATS	1.68	2.42	2.11	3.84	3.35	3.09

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	1.92	2.06	2.16	3.67	3.64	3.04
SPRING	1.89	2.31	2.24	4.11	3.83	3.75

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	3.09	2.94	3.28	2.94
BARLEY	2.87	2.54	2.89	3.09
OATS	2.83	2.22	3.03	2.92

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GRAIN TONNES/HECTARE

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

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.58	1.92	3.79	3.96
BARLEY	2.10	1.85	3.66	3.78
OATS	2.27	1.87	3.58	3.27

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	2.39	1.70	3.46	3.43
SPRING	2.24	2.06	3.89	3.90

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	3.08	2.99	3.37	3.30	3.10	2.52
BARLEY	3.19	2.62	2.47	2.86	2.98	2.97
OATS	2.74	2.78	3.22	2.54	2.82	2.38

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	2.93	2.66	3.01	2.68	2.84	2.35
SPRING	3.07	2.93	3.03	3.12	3.09	2.89

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)						
NONE	2.13	1.69	2.37	2.00	2.45	1.95
OXAMYL	3.88	3.91	3.67	3.80	3.48	3.30

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

TABLE	CROP(76)	SOW DATE(76)	NEMACIDE(78)	CROP(78)
SED	0.243	0.198	0.198	0.243

TABLE	STERILNT	CROP(76) SOW DATE(76)	CROP(76) NEMACIDE(78)	SOW DATE(76) NEMACIDE(78)
SED	0.076	0.343	0.343	0.280

TABLE	CROP(76) CROP(78)	SOW DATE(76) CROP(78)	NEMACIDE(78) CROP(78)	CROP(76) STERILNT
SED	0.420	0.343	0.343	0.260
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76)				0.131

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GRAIN TONNES/HECTARE

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

TABLE	SOW DATE(76) STERILNT	NEMACIDE(78) STERILNT	CROP(78) STERILNT	CROP(76) SOW DATE(76) NEMACIDE(78)
SED	0.212	0.212	0.260	0.485
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOW DATE(76)	0.107			
NEMACIDE(78)		0.107		
CROP(78)			0.131	

TABLE	CROP(76) SOW DATE(76) CROP(78)	CROP(76) NEMACIDE(78) CROP(78)	SOW DATE(76) NEMACIDE(78) CROP(78)	CROP(76) SOW DATE(76) STERILNT
SED	0.595	0.595	0.485	0.368
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).SOW DATE(76)				0.186

TABLE	CROP(76) NEMACIDE(78) STERILNT	SOW DATE(76) NEMACIDE(78) STERILNT	CROP(76) CROP(78) STERILNT	SOW DATE(76) CROP(78) STERILNT
SED	0.368	0.300	0.450	0.368
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).NEMACIDE(78)	0.186			
SOW DATE(76).NEMACIDE(78)		0.152		
CROP(76).CROP(78)			0.228	
SOW DATE(76).CROP(78)				0.186

TABLE	NEMACIDE(78) CROP(78) STERILNT
SED	0.368
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
NEMACIDE(78).CROP(78)	0.186

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

STRATUM	DF	SE	CV%
WP	4	0.595	20.6
WP.SP	16	0.322	11.2

GRAIN MEAN DM% 79.9

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STRAW TONNES/HECTARE

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

SOW DATE(76)	AUTUMN	SPRING	MEAN
CROP(76)			
WHEAT	3.20	3.09	3.14
BARLEY	2.89	3.13	3.01
OATS	2.66	3.20	2.93
MEAN	2.92	3.14	3.03

NEMACIDE(78)	NONE	OXAMYL	MEAN
CROP(76)			
WHEAT	2.54	3.75	3.14
BARLEY	2.25	3.77	3.01
OATS	2.37	3.49	2.93
MEAN	2.39	3.67	3.03

NEMACIDE(78)	NONE	OXAMYL	MEAN
SOW DATE(76)			
AUTUMN	2.20	3.64	2.92
SPRING	2.57	3.70	3.14
MEAN	2.39	3.67	3.03

CROP(78)	WHEAT	BARLEY	OATS	MEAN
CROP(76)				
WHEAT	2.98	3.49	2.97	3.14
BARLEY	3.23	2.66	3.14	3.01
OATS	2.71	3.25	2.82	2.93
MEAN	2.97	3.13	2.98	3.03

CROP(78)	WHEAT	BARLEY	OATS	MEAN
SOW DATE(76)				
AUTUMN	2.88	3.03	2.84	2.92
SPRING	3.07	3.23	3.11	3.14
MEAN	2.97	3.13	2.98	3.03

CROP(78)	WHEAT	BARLEY	OATS	MEAN
NEMACIDE(78)				
NONE	2.25	2.40	2.52	2.39
OXAMYL	3.70	3.87	3.43	3.67
MEAN	2.97	3.13	2.98	3.03

STERILNT	NONE	FORMALIN	MEAN
CROP(76)			
WHEAT	3.11	3.18	3.14
BARLEY	3.05	2.97	3.01
OATS	2.88	2.98	2.93
MEAN	3.01	3.05	3.03

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STRAW TONNES/HECTARE

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

STERILNT	NONE	FORMALIN	MEAN
SOW DATE(76)			
AUTUMN	3.01	2.83	2.92
SPRING	3.01	3.26	3.14
MEAN	3.01	3.05	3.03

STERILNT	NONE	FORMALIN	MEAN
NEMACIDE(78)			
NONE	2.42	2.35	2.39
OXAMYL	3.60	3.74	3.67
MEAN	3.01	3.05	3.03

STERILNT	NONE	FORMALIN	MEAN
CROP(78)			
WHEAT	2.95	3.00	2.97
BARLEY	3.14	3.13	3.13
OATS	2.94	3.01	2.98
MEAN	3.01	3.05	3.03

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	2.52	3.87	2.55	3.62
BARLEY	1.90	3.89	2.61	3.64
OATS	2.18	3.15	2.56	3.83

SOW DATE(76)	AUTUMN			SPRING		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	3.17	3.63	2.80	2.79	3.35	3.13
BARLEY	3.00	2.52	3.16	3.47	2.80	3.11
OATS	2.48	2.95	2.56	2.95	3.55	3.09

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	2.32	2.80	2.51	3.64	4.18	3.43
BARLEY	2.52	1.81	2.43	3.94	3.51	3.85
OATS	1.90	2.58	2.63	3.52	3.92	3.02

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	2.04	2.13	2.44	3.72	3.94	3.25
SPRING	2.46	2.67	2.60	3.68	3.80	3.61

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STRAW TONNES/HECTARE

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

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	3.14	3.26	3.08	3.10
BARLEY	3.01	2.78	3.09	3.17
OATS	2.89	2.44	2.87	3.52

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.65	2.43	3.56	3.94
BARLEY	2.29	2.22	3.80	3.73
OATS	2.32	2.42	3.44	3.54

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	2.43	1.98	3.59	3.68
SPRING	2.42	2.73	3.60	3.80

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	2.79	3.17	3.46	3.52	3.07	2.86
BARLEY	3.42	3.04	2.65	2.68	3.07	3.20
OATS	2.64	2.78	3.31	3.19	2.68	2.97

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	2.84	2.92	3.15	2.92	3.04	2.64
SPRING	3.06	3.08	3.13	3.34	2.84	3.38

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)						
NONE	2.49	2.00	2.37	2.43	2.40	2.64
OXAMYL	3.41	4.00	3.91	3.83	3.48	3.39

STRAW MEAN DM% 74.4

SUB PLOT AREA HARVESTED 0.00041

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79/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 fourth year, barley and potatoes.

For previous years see 76-78/W/CS/181.

Design: 3 series, each a single replicate of 24 plots.

Whole plot dimensions: 4.26 x 6.10.

Treatments:

Series I (barley 1979 after barley 1977 & 1978), Series II (potatoes 1979 after potatoes 1977, barley 1978): All combinations of:-

1. TREFOIL(768) Trefoil to barley in 1976 and 1978:

NONE	None
US	Undersown in spring
US+SS	Undersown in spring, sown into stubble after harvest
OS/SS	Oversown in July before harvest and/or sown into stubble after harvest

2. N Amounts of nitrogen fertiliser (kg N) cumulative in 1977 and 1979 (given basal N at 63 kg in 1978):

Series I to Barley	Series II to Potatoes	Series I to Barley	Series II 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 IV (barley): All combinations of:-

1. TREFOIL(768) Trefoil to barley in 1976, 1977, 1978 and 1979 (only US in 1979):

NONE	None
US	Undersown in spring
US+SS	Undersown in spring and sown into stubble after harvest
OS/SS	Oversown in July and/or sown into stubble after harvest

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2. N — Amounts of nitrogen fertiliser (kg N):

	1977, 1978 & 1979	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)

NOTES: (1) N to Series IV in 1976 was all applied to the seedbed.
(2) Series III has been abandoned.
(3) English common trefoil, inoculated with Rhizobium, at 26 kg, undersown in spring: 5 June, 1979.

Standard applications:
Barley, Great Hill III, Series I & Lansome III, Series IV: Manures: (0:20:20) at 300 kg, combine drilled. Weedkillers: Bromoxynil with ioxynil ('Oxytril CM' at 2.1 kg in 250 l).
Potatoes, Great Hill III, Series IV: Manures: (0:14:28) at 1280 kg. Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l on six occasions with insecticide on the first two. Insecticide: Pirimicarb at 0.14 kg on two occasions with fungicide. Haulm desiccant: Undiluted BOV at 170 l.

Seed: Barley: Porthos, dressed with ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Barley, Great Hill III, Series I: Ploughed: 3 Apr, 1979. Spring-tine cultivated with crumbler attached: 19 Apr. Seed sown: 30 Apr. Seedbed N applied: 2 May. Weedkiller applied: 4 June. Late N applied: 25 June. Combine harvested: 28 Aug.
Barley, Lansome III, Series IV: Ploughed: 6 Mar, 1979. Spring-tine cultivated with crumbler attached: 21 Apr. Seedbed N applied: 27 Apr. Seed sown: 30 Apr. Weedkiller applied: 4 June. Late N applied: 25 June. Combine harvested: 28 Aug.
Potatoes, Great Hill III, Series II: Ploughed: 3 Apr, 1979. Spring-tine cultivated with crumbler attached: 19 Apr. PK applied: 7 May. Seedbed N applied, rotary cultivated, potatoes planted: 9 May. Weedkillers applied: 25 May. Rotary ridged: 19 June. Late N applied: 25 June. Fungicide applied: 26 June, 10 July, 23 July, 8 Aug, 25 Aug, 6 Sept. Insecticide applied: 26 June, 10 July. Haulm mechanically destroyed, haulm desiccant applied: 24 Sept. Lifted: 19 Oct.

NOTE: Samples of trefoil and weeds were dug in March, before ploughing, on Series I & IV for the determination of dry matter and N.

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79/W/CS/181 BARLEY SERIES I

GRAIN TONNES/HECTARE

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

N TREFOIL(768)	0	50	100	150	50+50	100+50	MEAN
NONE	1.02	3.07	3.39	3.84	3.20	5.22	3.29
US	0.91	2.68	3.78	3.39	3.29	3.49	2.92
US+SS	1.36	2.56	5.04	4.05	4.04	3.67	3.45
OS/SS	1.41	2.73	3.67	3.27	3.47	3.55	3.02
MEAN	1.18	2.76	3.97	3.63	3.50	3.98	3.17

GRAIN MEAN DM% 84.1

STRAW TONNES/HECTARE

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

N TREFOIL(768)	0	50	100	150	50+50	100+50	MEAN
NONE	0.53	1.56	2.20	2.56	1.48	3.46	1.96
US	0.48	1.32	2.68	1.69	1.73	2.39	1.71
US+SS	0.53	1.25	3.27	3.17	2.19	2.49	2.15
OS/SS	0.58	1.61	2.55	1.95	1.87	2.22	1.80
MEAN	0.53	1.43	2.68	2.34	1.82	2.64	1.91

STRAW MEAN DM% 87.8 PLOT AREA HARVESTED 0.00173

79/W/CS/181 BARLEY SERIES IV

GRAIN TONNES/HECTARE

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

N TREFOIL(768)	0	50	100	150	50+50	100+50	MEAN
NONE	0.11	2.10	2.22	2.45	1.67	3.19	1.96
US	0.17	1.50	2.28	2.90	1.66	2.71	1.87
US+SS	0.28	1.45	2.89	3.06	2.33	1.90	1.98
OS/SS	0.17	1.55	2.28	2.46	1.28	2.34	1.68
MEAN	0.18	1.65	2.42	2.72	1.74	2.53	1.87

GRAIN MEAN DM% 82.0

STRAW TONNES/HECTARE

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

N TREFOIL(768)	0	50	100	150	50+50	100+50	MEAN
NONE	0.10	1.05	1.47	1.72	1.11	1.93	1.23
US	0.05	0.96	1.43	1.97	1.05	1.64	1.18
US+SS	0.15	0.94	1.78	1.63	1.34	1.86	1.28
OS/SS	0.16	0.94	1.55	1.69	0.98	1.64	1.16
MEAN	0.12	0.97	1.56	1.75	1.12	1.76	1.21

STRAW MEAN DM% 86.0 PLOT AREA HARVESTED 0.00173

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79/W/CS/181

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

N	0	100	200	300	100+100	200+100	MEAN
TREFOIL(768)							
NONE	9.5	20.0	20.5	38.4	19.5	18.2	21.0
US	8.9	27.6	25.3	35.6	24.1	17.1	23.1
US+SS	4.5	15.6	20.1	18.0	23.4	24.1	17.6
OS/SS	5.7	19.0	29.1	25.8	15.5	29.3	20.7
MEAN	7.1	20.5	23.7	29.5	20.6	22.2	20.6

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

N	0	100	200	300	100+100	200+100	MEAN
TREFOIL(768)							
NONE	89.0	94.2	94.9	97.9	89.9	96.2	93.7
US	80.5	93.7	94.5	98.1	90.0	94.6	91.9
US+SS	61.5	93.3	96.6	91.0	92.1	93.3	88.0
OS/SS	85.7	95.8	94.0	94.2	88.1	94.5	92.0
MEAN	79.2	94.3	95.0	95.3	90.0	94.6	91.4

PLOT AREA HARVESTED 0.00087

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79/R/CS/200 and 79/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.

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The third year, ryegrass, white clover, lucerne.

For previous years see 77-78/R&W/CS/200.

Design: Single replicate of 2 plots split into 50.

Whole plot dimensions: Pastures (R): 23.8 x 24.5.
Butt Furlong (W): 22.3 x 24.5.

Treatments: Combinations of:-

Whole plots

1. IRRIGATN — Irrigation:

   NONE — None
   FULL — Irrigated to reduce a soil moisture deficit of 25 mm to zero

Sub plots

2. TREATMNT — Treatments, combinations of:

Species:

- Ryegrass, S.23, (RG)
- Ryegrass, S.23 + Clover, Blanca (GB)
- Ryegrass, S.23 + Clover, S.100 (GS)
- Clover, Blanca (CL)
- Lucerne, Vertus (LU)

Cutting frequencies:

- Three times (3)
- Six times (6)

Amounts of nitrogen fertiliser (kg N total per annum, applied as (25:0:16)):

- 0, 100, 200, 300, 400, 500, 600 (N0, N1, N2, N3, N4, N5, N6)

Times of applying nitrogen fertiliser:

- Not applied (--), N0 only
- Divided equally between cuts (DE)
- In spring only (SP)
- Half in spring, half in summer (SS)

Control of pathogens:

- None (-)
- Controlled (C)

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79/R/CS/200 and 79/W/CS/200

The following combinations are tested:

RG6N0---	GB3N0--- (duplicated)	CL3N0--- (duplicated)
RG6N1DE-	GB3N1DE-	CL3N2DE- "
RG6N2DE-	GB3N2DE-	CL3N0--C "
RG6N3DE-	GB3N3DE-	CL3N2DEC "
RG6N4DE-	GB3N4DE-	
RG6N5DE-		LU3N0--- "
RG6N6DE-	GB3N0--C	LU3N0--C "
	GB3N1DEC	
GB6N0---	GB3N2DEC	
GB6N1DE-	GB3N3DEC	
GB6N2DE-	GB3N4DEC	
GB6N3DE-		
GB6N4DE-	GB3N1SP- (duplicated)	
	GB3N1SS- "	
GS6N0---	GB3N2SS "	
GS6N1DE-		
GS6N2DE-	RG3N2DE- "	
GS6N3DE-	RG3N2DEC "	
GS6N4DE-		

NOTES: (1) Pathogen control consisted of:- (1) Aldicarb at 10 kg applied in the spring except to LU which received phorate at 5.0 kg, (2) benomyl foliar spray at 0.56 kg + phorate at 5.0 kg, applied as granules, after each cut, (3) two additional benomyl foliar sprays at 0.56 kg in winter.

(2) Irrigation was applied as follows (mm water):

Pastures (R)

8 June	12.5
20 June	25
4 July	25
11 July	25
3 Aug	20
29 Aug	12.5
19 Sept	25
Total	145

Butt Furlong (W)

12 June	12.5
22 June	25
25 June	25
5 July	25
11 July	25
18 July	25
25 July	25
3 Aug	12.5
16 Aug	12.5
6 Sept	25
10 Sept	12.5
Total	225

(3) N0 plots received 64 kg K20, as muriate of potash, after the fourth cutting occasion.

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79/R/CS/200 and 79/W/CS/200

Standard applications:
Pastures (R) All plots: Manures: (0:14:28) at 1070 kg. Weedkillers: Propyzamide at 0.7 kg in 700 l to CL and LU plots only. Dicamba with mecoprop and MCPA ('Banlene plus' at 4.9 kg) in 220 l to RG plots only. Dicamba with mecoprop and MCPA ('Tetralex plus' at 5.6 kg) in 170 l to RG plots only.
Butt Furlong (W) All plots: Manures: Magnesian limestone at 2.5 t, (0:14:28) at 1080 kg. Weedkillers: Propyzamide at 0.7 kg in 780 l to CL and LU plots only. Dicamba with mecoprop and MCPA ('Banlene plus' at 4.9 kg) in 220 l to RG plots only. Dicamba with mecoprop and MCPA ('Tetralex plus' at 5.6 kg) in 170 l to RG plots only.

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.

Pastures (R) sown: 20 May, 1977.
Butt Furlong (W) sown: 23 May, 1977.

Cultivations, etc.:-
Pastures (R): Benomyl and phorate applied: 4 Oct, 1978. Propyzamide applied: 10 Oct. PK applied: 7 Nov. Benomyl applied: 9 Nov, 9 Jan, 1979. Aldicarb applied to all C plots except LU and phorate to C plots of LU: 2 Mar. Benomyl and phorate applied: 10 May, 5 June, 3 July, 31 July, 28 Aug, 25 Sept. NK applied six times: 23 Mar, 10 May, 5 June, 3 July, 31 July, 28 Aug. '6-cut' plots cut: 10 May, 5 June, 3 July, 31 July. '3-cut' plots cut: 5 June, 31 July, 25 Sept.
Butt Furlong (W): Benomyl, phorate and magnesian limestone applied: 27 Sept, 1978. Propyzamide applied: 10 Oct. Benomyl applied: 9 Nov. PK applied: 24 Nov. Benomyl applied: 10 Jan, 1979. Aldicarb applied to all C plots except LU and phorate to C plots of LU: 2 Mar. Benomyl and phorate applied: 15 May, 6 June, 5 July, 2 Aug, 29 Aug, 26 Sept.
NK applied six times: 23 Mar, 15 May, 6 June, 5 July, 2 Aug, 29 Aug.
'6-cut' plots cut: 15 May, 6 June, 4 July, 2 Aug, 29 Aug, 26 Sept.
'3-cut' plots cut: 6 June, 2 Aug, 26 Sept.

NOTE: Assessments of pests and diseases were made during the season.
Nitrogen percentages of crop produce were measured.

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79/R/CS/200 PASTURES (R)

1ST CUTTING OCCASION (10/5/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.00	0.00	0.00
RG6N1DE-	0.04	0.00	0.02
RG6N2DE-	0.05	0.07	0.06
RG6N3DE-	0.10	0.03	0.07
RG6N4DE-	0.18	0.10	0.14
RG6N5DE-	0.28	0.11	0.19
RG6N6DE-	0.37	0.21	0.29
GB6N0---	0.03	0.00	0.01
GB6N1DE-	0.42	0.00	0.21
GB6N2DE-	0.22	0.06	0.14
GB6N3DE-	0.32	0.08	0.20
GB6N4DE-	0.44	0.00	0.22
GS6N0---	0.08	0.01	0.05
GS6N1DE-	0.06	0.04	0.05
GS6N2DE-	0.23	0.05	0.14
GS6N3DE-	0.28	0.08	0.18
GS6N4DE-	0.21	0.24	0.23
MEAN	0.20	0.06	0.13

* USE STANDARD ERRORS ONLY TO COMPARE TREATMNT LEVELS
GB3N0---,GB3N1SP-,GB3N1SS-,GB3N2SS-,RG3N2DE-,RG3N2DEC,
CL3N0---,CL3N2DE-,CL3N0--C,CL3N2DEC,LU3N0---,LU3N0--C
AND WITHIN THE SAME LEVEL OF IRRIGATN.

1ST CUTTING OCCASION MEAN DM% 21.9

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79/R/CS/200 PASTURES (R)

2ND CUTTING OCCASION (5/6/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.26	0.33	0.30
RG6N1DE-	0.91	0.73	0.82
RG6N2DE-	1.69	1.37	1.53
RG6N3DE-	2.51	1.86	2.19
RG6N4DE-	3.51	2.85	3.18
RG6N5DE-	3.64	3.56	3.60
RG6N6DE-	4.16	3.44	3.80
GB6N0---	2.54	1.93	2.24
GB6N1DE-	2.74	2.71	2.73
GB6N2DE-	2.98	2.81	2.90
GB6N3DE-	3.27	2.90	3.09
GB6N4DE-	3.63	2.92	3.27
GS6N0---	2.50	2.42	2.46
GS6N1DE-	2.94	2.73	2.83
GS6N2DE-	3.33	2.68	3.01
GS6N3DE-	3.83	3.18	3.50
GS6N4DE-	3.72	3.72	3.72
GB3N0---	2.62	1.39	2.01
GB3N1DE-	2.75	2.35	2.55
GB3N2DE-	2.54	2.10	2.32
GB3N3DE-	3.00	1.86	2.43
GB3N4DE-	2.90	2.56	2.73
GB3N0--C	2.63	2.82	2.72
GB3N1DEC	3.20	2.76	2.98
GB3N2DEC	2.86	2.22	2.54
GB3N3DEC	2.81	2.81	2.81
GB3N4DEC	3.11	2.09	2.60
GB3N1SP-	2.76	1.68	2.22
GB3N1SS-	2.88	2.00	2.44
GB3N2SS-	2.78	1.85	2.32
RG3N2DE-	2.00	1.61	1.80
RG3N2DEC	2.46	1.58	2.02
CL3N0---	2.17	2.20	2.18
CL3N2DE-	2.41	1.34	1.87
CL3N0--C	2.46	2.00	2.23
CL3N2DEC	2.34	2.07	2.20
LU3N0---	4.28	3.17	3.72
LU3N0--C	4.77	3.91	4.34
MEAN	2.84	2.27	2.55

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.245	0.346

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

STRATUM	DF	SE	CV%
WP.SP	24	0.346	13.6

2ND CUTTING OCCASION MEAN DM% 13.1

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79/R/CS/200 PASTURES (R)

3RD CUTTING OCCASION (3/7/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.42	0.56	0.49
RG6N1DE-	1.27	0.73	1.00
RG6N2DE-	2.10	1.60	1.85
RG6N3DE-	2.16	2.07	2.11
RG6N4DE-	2.14	2.66	2.40
RG6N5DE-	2.68	2.29	2.49
RG6N6DE-	2.02	2.22	2.12
GB6N0---	2.32	2.37	2.35
GB6N1DE-	2.35	2.23	2.29
GB6N2DE-	2.58	2.34	2.46
GB6N3DE-	2.50	2.45	2.48
GB6N4DE-	2.77	2.29	2.53
GS6N0---	2.27	2.25	2.26
GS6N1DE-	2.36	2.40	2.38
GS6N2DE-	2.26	2.29	2.27
GS6N3DE-	2.20	2.33	2.26
GS6N4DE-	2.32	2.42	2.37
MEAN	2.16	2.09	2.12

3RD CUTTING OCCASION MEAN DM% 16.6

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79/R/CS/200 PASTURES (R)

4TH CUTTING OCCASION (31/7/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.10	0.08	0.09
RG6N1DE-	0.09	0.45	0.27
RG6N2DE-	0.40	1.58	0.99
RG6N3DE-	0.40	1.89	1.14
RG6N4DE-	0.64	2.79	1.71
RG6N5DE-	0.68	3.09	1.89
RG6N6DE-	0.91	3.53	2.22
GB6N0---	0.98	2.49	1.73
GB6N1DE-	0.60	2.02	1.31
GB6N2DE-	0.84	2.46	1.65
GB6N3DE-	1.24	2.39	1.82
GB6N4DE-	0.82	2.05	1.43
GS6N0---	0.07	2.28	1.18
GS6N1DE-	0.26	2.56	1.41
GS6N2DE-	0.91	2.53	1.72
GS6N3DE-	1.28	2.58	1.93
GS6N4DE-	1.03	2.69	1.86
GB3N0---	2.55	3.50	3.03
GB3N1DE-	2.17	3.25	2.71
GB3N2DE-	3.16	2.84	3.00
GB3N3DE-	2.45	3.46	2.95
GB3N4DE-	3.11	2.97	3.04
GB3N0--C	3.66	4.09	3.87
GB3N1DEC	3.47	2.98	3.22
GB3N2DEC	3.10	4.44	3.77
GB3N3DEC	3.41	3.91	3.66
GB3N4DEC	4.77	4.81	4.79
GB3N1SP-	2.90	3.79	3.35
GB3N1SS-	2.74	2.59	2.67
GB3N2SS-	3.06	2.86	2.96
RG3N2DE-	4.46	4.27	4.37
RG3N2DEC	4.85	5.43	5.14
CL3N0---	2.17	2.22	2.20
CL3N2DE-	2.77	2.85	2.81
CL3N0--C	2.93	3.76	3.35
CL3N2DEC	1.80	3.64	2.72
LU3N0---	5.47	5.04	5.25
LU3N0--C	5.74	5.78	5.76
MEAN	2.47	3.23	2.85

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.328	0.464

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

STRATUM	DF	SE	CV%
WP.SP	24	0.464	16.3

4TH CUTTING OCCASION MEAN DM% 22.3

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79/R/CS/200 PASTURES (R)

5TH CUTTING OCCASION (28/8/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.15	0.13	0.14
RG6N1DE-	0.42	0.21	0.32
RG6N2DE-	1.19	1.13	1.16
RG6N3DE-	1.31	1.41	1.36
RG6N4DE-	1.77	1.83	1.80
RG6N5DE-	1.90	1.47	1.69
RG6N6DE-	1.84	2.14	1.99
GB6N0---	1.40	1.36	1.38
GB6N1DE-	1.46	1.55	1.50
GB6N2DE-	1.73	1.22	1.48
GB6N3DE-	1.45	1.69	1.57
GB6N4DE-	1.78	1.56	1.67
GS6N0---	1.24	1.46	1.35
GS6N1DE-	1.39	1.65	1.52
GS6N2DE-	1.57	1.41	1.49
GS6N3DE-	1.91	1.60	1.75
GS6N4DE-	1.89	1.77	1.83
MEAN	1.44	1.39	1.41

5TH CUTTING OCCASION MEAN DM% 15.3

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79/R/CS/200 PASTURES (R)

6TH CUTTING OCCASION (25/9/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.00	0.12	0.06
RG6N1DE-	0.12	0.27	0.20
RG6N2DE-	0.39	0.83	0.61
RG6N3DE-	0.51	0.89	0.70
RG6N4DE-	0.68	1.42	1.05
RG6N5DE-	0.82	1.06	0.94
RG6N6DE-	0.60	0.92	0.76
GB6N0---	0.52	1.02	0.77
GB6N1DE-	0.47	1.13	0.80
GB6N2DE-	0.52	1.08	0.80
GB6N3DE-	0.65	1.12	0.89
GB6N4DE-	0.62	0.90	0.76
GS6N0---	0.52	0.85	0.68
GS6N1DE-	0.45	0.99	0.72
GS6N2DE-	0.62	1.04	0.83
GS6N3DE-	0.73	1.00	0.86
GS6N4DE-	0.73	1.28	1.00
GB3N0---	1.96	1.40	1.68
GB3N1DE-	1.33	1.51	1.42
GB3N2DE-	2.23	2.33	2.28
GB3N3DE-	1.53	2.61	2.07
GB3N4DE-	2.06	2.57	2.32
GB3N0--C	2.58	2.17	2.37
GB3N1DEC	2.56	2.59	2.57
GB3N2DEC	2.52	3.57	3.05
GB3N3DEC	2.43	3.57	3.00
GB3N4DEC	2.69	2.59	2.64
GB3N1SP-	1.80	1.42	1.61
GB3N1SS-	2.02	2.14	2.08
GB3N2SS-	2.39	2.39	2.39
RG3N2DE-	2.26	1.81	2.04
RG3N2DEC	1.60	2.09	1.85
CL3N0---	1.57	1.97	1.77
CL3N2DE-	1.53	1.66	1.60
CL3N0--C	2.40	1.95	2.18
CL3N2DEC	1.90	2.55	2.23
LU3N0---	3.07	3.41	3.24
LU3N0--C	3.48	3.56	3.52
MEAN	1.62	1.84	1.73

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.216	0.306

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

STRATUM	DF	SE	CV%
WP.SP	24	0.306	17.7

6TH CUTTING OCCASION MEAN DM% 16.6

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79/R/CS/200 PASTURES (R)

TOTAL OF 6 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.93	1.22	1.08
RG6N1DE-	2.85	2.39	2.62
RG6N2DE-	5.81	6.58	6.20
RG6N3DE-	6.98	8.16	7.57
RG6N4DE-	8.91	11.65	10.28
RG6N5DE-	10.00	11.58	10.79
RG6N6DE-	9.90	12.45	11.18
GB6N0---	7.78	9.18	8.48
GB6N1DE-	8.04	9.64	8.84
GB6N2DE-	8.88	9.97	9.42
GB6N3DE-	9.44	10.63	10.03
GB6N4DE-	10.06	9.72	9.89
GS6N0---	6.68	9.28	7.98
GS6N1DE-	7.47	10.37	8.92
GS6N2DE-	8.91	10.00	9.46
GS6N3DE-	10.22	10.76	10.49
GS6N4DE-	9.90	12.12	11.01
GB3N0---	7.13	6.30	6.71
GB3N1DE-	6.25	7.11	6.68
GB3N2DE-	7.93	7.27	7.60
GB3N3DE-	6.98	7.93	7.45
GB3N4DE-	8.07	8.11	8.09
GB3N0--C	8.86	9.08	8.97
GB3N1DEC	9.23	8.32	8.78
GB3N2DEC	8.48	10.23	9.36
GB3N3DEC	8.65	10.29	9.47
GB3N4DEC	10.58	9.48	10.03
GB3N1SP-	7.47	6.89	7.18
GB3N1SS-	7.64	6.73	7.19
GB3N2SS-	8.22	7.10	7.66
RG3N2DE-	8.72	7.70	8.21
RG3N2DEC	8.91	9.10	9.01
CL3N0---	5.91	6.39	6.15
CL3N2DE-	6.71	5.85	6.28
CL3N0--C	7.79	7.70	7.75
CL3N2DEC	6.04	8.25	7.15
LU3N0---	12.82	11.62	12.22
LU3N0--C	13.99	13.26	13.63
MEAN	8.21	8.55	8.38

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.560	0.791

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

STRATUM	DF	SE	CV%
WP.SP	24	0.791	9.4

TOTAL OF 6 CUTTING OCCASIONS MEAN DM% 14.3

SUB PLOT AREA HARVESTED 0.00038

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79/W/CS/200 BUTT FURLONG (W)

1ST CUTTING OCCASION (15/5/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.00	0.16	0.08
RG6N1DE-	0.16	0.25	0.21
RG6N2DE-	0.38	0.24	0.31
RG6N3DE-	0.79	0.85	0.82
RG6N4DE-	1.56	0.69	1.12
RG6N5DE-	1.87	1.04	1.46
RG6N6DE-	1.97	1.07	1.52
GB6N0---	2.33	1.87	2.10
GB6N1DE-	2.23	1.80	2.02
GB6N2DE-	2.40	2.11	2.25
GB6N3DE-	2.90	2.27	2.59
GB6N4DE-	2.81	1.76	2.28
GS6N0---	1.03	1.31	1.17
GS6N1DE-	1.69	1.02	1.35
GS6N2DE-	1.45	1.41	1.43
GS6N3DE-	1.41	1.40	1.40
GS6N4DE-	2.14	1.69	1.91
MEAN	1.59	1.23	1.41

1ST CUTTING OCCASION MEAN DM% 19.7

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79/W/CS/200 BUTT FURLONG (W)

2ND CUTTING OCCASION (6/6/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.14	0.44	0.29
RG6N1DE-	0.39	0.63	0.51
RG6N2DE-	1.18	0.85	1.02
RG6N3DE-	1.63	1.49	1.56
RG6N4DE-	2.50	2.14	2.32
RG6N5DE-	2.25	2.87	2.56
RG6N6DE-	2.56	2.33	2.44
GB6N0---	1.55	1.94	1.74
GB6N1DE-	1.73	1.85	1.79
GB6N2DE-	1.89	1.62	1.76
GB6N3DE-	2.00	2.04	2.02
GB6N4DE-	2.04	2.11	2.08
GS6N0---	1.16	1.60	1.38
GS6N1DE-	1.59	1.83	1.71
GS6N2DE-	1.89	2.14	2.01
GS6N3DE-	2.08	2.19	2.13
GS6N4DE-	2.14	2.49	2.31
GB3N0---	3.68	3.14	3.41
GB3N1DE-	3.62	3.61	3.62
GB3N2DE-	5.01	3.41	4.21
GB3N3DE-	5.44	3.57	4.51
GB3N4DE-	4.76	3.41	4.08
GB3N0--C	4.01	3.06	3.54
GB3N1DEC	4.09	4.16	4.13
GB3N2DEC	4.51	4.14	4.32
GB3N3DEC	6.02	4.05	5.04
GB3N4DEC	5.88	5.16	5.52
GB3N1SP-	4.72	3.27	3.99
GB3N1SS-	4.11	2.73	3.42
GB3N2SS-	4.42	3.17	3.79
RG3N2DE-	3.13	2.42	2.78
RG3N2DEC	2.56	3.29	2.93
CL3N0---	2.80	2.57	2.68
CL3N2DE-	2.79	2.60	2.69
CL3N0--C	2.35	2.33	2.34
CL3N2DEC	2.73	2.68	2.70
LU3N0---	5.63	4.44	5.04
LU3N0--C	4.06	4.22	4.14
MEAN	3.16	2.78	2.97

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.226	0.320

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

STRATUM	DF	SE	CV%
WP.SP	24	0.320	10.8

2ND CUTTING OCCASION MEAN DM% 14.3

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79/W/CS/200 BUTT FURLONG (W)

3RD CUTTING OCCASION (4/7/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.31	0.31	0.31
RG6N1DE-	0.61	0.54	0.58
RG6N2DE-	1.82	1.35	1.59
RG6N3DE-	2.24	1.61	1.93
RG6N4DE-	2.52	2.51	2.52
RG6N5DE-	2.46	2.64	2.55
RG6N6DE-	1.77	2.41	2.09
GB6N0---	1.99	2.36	2.18
GB6N1DE-	2.13	2.30	2.22
GB6N2DE-	2.44	2.46	2.45
GB6N3DE-	2.61	2.40	2.50
GB6N4DE-	2.56	2.28	2.42
GS6N0---	1.20	1.89	1.54
GS6N1DE-	1.99	2.05	2.02
GS6N2DE-	2.10	1.97	2.03
GS6N3DE-	2.33	1.98	2.16
GS6N4DE-	2.37	2.65	2.51
MEAN	1.97	1.98	1.98

3RD CUTTING OCCASION MEAN DM% 19.1

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79/W/CS/200 BUTT FURLONG (W)

4TH CUTTING OCCASION (2/8/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.13	0.18	0.15
RG6N1DE-	0.12	0.26	0.19
RG6N2DE-	0.27	0.80	0.53
RG6N3DE-	0.19	1.66	0.92
RG6N4DE-	0.10	2.19	1.15
RG6N5DE-	0.22	1.86	1.04
RG6N6DE-	0.19	2.25	1.22
GB6N0---	0.08	2.19	1.14
GB6N1DE-	0.08	1.94	1.01
GB6N2DE-	0.09	1.73	0.91
GB6N3DE-	0.15	2.20	1.17
GB6N4DE-	0.21	2.17	1.19
GS6N0---	0.09	1.79	0.94
GS6N1DE-	0.18	2.06	1.12
GS6N2DE-	0.18	1.83	1.00
GS6N3DE-	0.09	1.50	0.79
GS6N4DE-	0.18	1.99	1.08
GB3N0---	1.07	2.43	1.75
GB3N1DE-	1.61	2.56	2.09
GB3N2DE-	1.61	2.42	2.02
GB3N3DE-	1.85	2.77	2.31
GB3N4DE-	2.45	2.50	2.47
GB3N0--C	1.95	3.58	2.77
GB3N1DEC	2.61	3.52	3.07
GB3N2DEC	2.77	2.67	2.72
GB3N3DEC	2.12	3.75	2.94
GB3N4DEC	3.07	4.37	3.72
GB3N1SP-	1.28	2.04	1.66
GB3N1SS-	1.54	1.79	1.66
GB3N2SS-	1.67	2.52	2.09
RG3N2DE-	2.22	3.52	2.87
RG3N2DEC	3.23	4.93	4.08
CL3N0---	1.13	2.36	1.74
CL3N2DE-	1.11	2.05	1.58
CL3N0--C	1.31	2.30	1.80
CL3N2DEC	1.42	2.59	2.01
LU3N0---	4.12	4.88	4.50
LU3N0--C	4.75	5.02	4.88
MEAN	1.45	2.59	2.02

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.300	0.424

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

STRATUM	DF	SE	CV%
WP.SP	24	0.424	21.0

4TH CUTTING OCCASION MEAN DM% 23.2

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79/W/CS/200 PASTURES (R)

5TH CUTTING OCCASION (29/8/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.00	0.14	0.07
RG6N1DE-	0.30	0.29	0.30
RG6N2DE-	1.33	0.98	1.15
RG6N3DE-	1.02	1.76	1.39
RG6N4DE-	0.48	1.58	1.03
RG6N5DE-	0.25	1.75	1.00
RG6N6DE-	0.36	1.93	1.15
GB6N0---	0.90	1.61	1.26
GB6N1DE-	1.14	1.48	1.31
GB6N2DE-	1.09	1.78	1.44
GB6N3DE-	1.28	1.56	1.42
GB6N4DE-	1.24	1.38	1.31
GS6N0---	0.63	1.65	1.14
GS6N1DE-	0.82	1.53	1.17
GS6N2DE-	1.07	1.43	1.25
GS6N3DE-	0.90	1.48	1.19
GS6N4DE-	0.60	1.86	1.23
MEAN	0.79	1.42	1.11

5TH CUTTING OCCASION MEAN DM% 15.7

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79/W/CS/200 BUTT FURLONG (W)

6TH CUTTING OCCASION (6/9/79) DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.10	0.15	0.12
RG6N1DE-	0.27	0.45	0.36
RG6N2DE-	0.56	0.75	0.66
RG6N3DE-	0.60	1.37	0.99
RG6N4DE-	0.17	0.71	0.44
RG6N5DE-	0.12	1.72	0.92
RG6N6DE-	0.23	1.47	0.85
GB6N0---	0.43	1.07	0.75
GB6N1DE-	0.64	0.93	0.79
GB6N2DE-	0.49	1.14	0.82
GB6N3DE-	0.44	1.14	0.79
GB6N4DE-	0.93	1.02	0.97
GS6N0---	0.41	1.46	0.93
GS6N1DE-	0.33	1.11	0.72
GS6N2DE-	0.26	1.35	0.80
GS6N3DE-	0.30	1.32	0.81
GS6N4DE-	0.33	1.50	0.91
GB3N0---	1.12	1.46	1.29
GB3N1DE-	1.18	1.26	1.22
GB3N2DE-	1.32	1.31	1.31
GB3N3DE-	1.83	1.44	1.64
GB3N4DE-	2.05	1.50	1.78
GB3N0--C	2.27	2.33	2.30
GB3N1DEC	2.27	2.48	2.37
GB3N2DEC	2.83	2.67	2.75
GB3N3DEC	3.02	2.38	2.70
GB3N4DEC	3.08	2.61	2.84
GB3N1SP-	1.33	1.29	1.31
GB3N1SS-	1.43	1.20	1.31
GB3N2SS-	1.71	1.39	1.55
RG3N2DE-	2.73	2.53	2.63
RG3N2DEC	3.04	3.25	3.14
CL3N0---	1.25	1.35	1.30
CL3N2DE-	1.07	1.24	1.16
CL3N0--C	1.81	1.94	1.88
CL3N2DEC	1.73	2.14	1.94
LU3N0---	2.53	3.06	2.80
LU3N0--C	2.92	3.79	3.36
MEAN	1.44	1.72	1.58

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.185	0.262

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

STRATUM	DF	SE	CV%
WP.SP	24	0.262	16.6

6TH CUTTING OCCASION MEAN DM% 18.9

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79/W/CS/200 BUTT FURLONG (W)

TOTAL OF 6 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE

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

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.67	1.36	1.02
RG6N1DE-	1.86	2.42	2.14
RG6N2DE-	5.54	4.97	5.26
RG6N3DE-	6.46	8.74	7.60
RG6N4DE-	7.33	9.82	8.57
RG6N5DE-	7.18	11.87	9.52
RG6N6DE-	7.09	11.47	9.28
GB6N0---	7.28	11.05	9.17
GB6N1DE-	7.95	10.30	9.13
GB6N2DE-	8.39	10.85	9.62
GB6N3DE-	9.38	11.61	10.50
GB6N4DE-	9.80	10.72	10.26
GS6N0---	4.52	9.69	7.11
GS6N1DE-	6.59	9.59	8.09
GS6N2DE-	6.94	10.13	8.53
GS6N3DE-	7.11	9.87	8.49
GS6N4DE-	7.76	12.17	9.96
GB3N0---	5.87	7.04	6.45
GB3N1DE-	6.42	7.44	6.93
GB3N2DE-	7.94	7.14	7.54
GB3N3DE-	9.13	7.78	8.46
GB3N4DE-	9.27	7.40	8.33
GB3N0--C	8.23	8.98	8.60
GB3N1DEC	8.97	10.16	9.57
GB3N2DEC	10.12	9.47	9.79
GB3N3DEC	11.16	10.18	10.67
GB3N4DEC	12.03	12.14	12.09
GB3N1SP-	7.34	6.59	6.96
GB3N1SS-	7.07	5.71	6.39
GB3N2SS-	7.80	7.08	7.44
RG3N2DE-	8.08	8.47	8.27
RG3N2DEC	8.83	11.47	10.15
CL3N0---	5.18	6.27	5.73
CL3N2DE-	4.96	5.89	5.43
CL3N0--C	5.47	6.57	6.02
CL3N2DEC	5.88	7.41	6.65
LU3N0---	12.28	12.39	12.33
LU3N0--C	11.73	13.04	12.38
MEAN	7.52	8.66	8.09

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

TABLE	TREATMNT*	TREATMNT* IRRIGATN
SED	0.563	0.796

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

STRATUM	DF	SE	CV%
WP.SP	24	0.796	9.8

TOTAL OF 6 CUTTING OCCASIONS MEAN DM% 15.4

SUBPLOT AREA HARVESTED 0.00038

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79/R/CS/201

FACTORS AFFECTING YIELD

Object: To study the residual effects on wheat of a range of treatments applied to field beans in 1977 - 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 third year, winter wheat.

For previous years see 77-78/R/CS/201.

Design: Half replicate of 2^8 in 8 blocks of 2 plots split into 8.

Whole plot dimensions: 10.4 x 57.6.

Treatments applied in 1977: Combinations of:-

Whole plots

1. IRRIGATN(77) Irrigation:

NONE	None
FULL	Full (119 mm)

Sub plots

2. N(77) Nitrogen fertiliser at flowering (kg N):

0
150

3. ALDICARB(77) Aldicarb to seedbed (kg):

0
10

4. FONOFOS(77) Fonofos to seedbed (kg):

0
5

5. BEN 1(77) Benomyl to seedbed (kg):

0
32

6. PERMETH(77) Permethrin foliar spray (kg):

0.00
0.15

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7. PIRIMICA(77) Pirimicarb foliar spray (kg):

0.00
0.14

8. BEN 2(77) Benomyl foliar spray (kg):

0.0
0.6

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 380 kg. Weedkiller: Mecoprop at 2.5 kg in 220 l.

Seed: Atou, sown at 200 kg.

Cultivations, etc.:- Ploughed: 18 Oct, 1978. Rotary harrowed: 19 Oct. Seed sown: 20 Oct. N applied: 27 Apr, 1979. Weedkiller applied: 8 May. Combine harvested: 30 Aug.

NOTES: (1) The crop was sampled in July for take-all and eyespot assessments.
(2) There were marked differences in yields between the outer and inner strips of subplots; the yields presented have been adjusted for this.

GRAIN TONNES/HECTARE

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

N(77)	0	150	MEAN
IRRIGATN(77)			
NONE	4.77	4.38	4.57
FULL	4.96	4.95	4.96
MEAN	4.86	4.67	4.77

ALDICARB(77)	0	10	MEAN
IRRIGATN(77)			
NONE	4.89	4.26	4.57
FULL	5.08	4.84	4.96
MEAN	4.99	4.55	4.77

ALDICARB(77)	0	10	MEAN
N(77)			
0	5.08	4.65	4.86
150	4.89	4.44	4.67
MEAN	4.99	4.55	4.77

FONOFOS(77)	0	5	MEAN
IRRIGATN(77)			
NONE	4.69	4.46	4.57
FULL	4.93	4.98	4.96
MEAN	4.81	4.72	4.77

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79/R/CS/201

GRAIN TONNES/HECTARE

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

FONOFOS(77)	0	5	MEAN
N(77)			
0	5.00	4.73	4.86
150	4.63	4.71	4.67
MEAN	4.81	4.72	4.77

FONOFOS(77)	0	5	MEAN
ALDICARB(77)			
0	4.99	4.98	4.99
10	4.63	4.46	4.55
MEAN	4.81	4.72	4.77

BEN 1(77)	0	32	MEAN
IRRIGATN(77)			
NONE	4.54	4.61	4.57
FULL	4.74	5.17	4.96
MEAN	4.64	4.89	4.77

BEN 1(77)	0	32	MEAN
N(77)			
0	4.71	5.02	4.86
150	4.57	4.76	4.67
MEAN	4.64	4.89	4.77

BEN 1(77)	0	32	MEAN
ALDICARB(77)			
0	4.83	5.14	4.99
10	4.45	4.64	4.55
MEAN	4.64	4.89	4.77

BEN 1(77)	0	32	MEAN
FONOFOS(77)			
0	4.75	4.87	4.81
5	4.53	4.91	4.72
MEAN	4.64	4.89	4.77

PERMETH(77)	0.00	0.15	MEAN
IRRIGATN(77)			
NONE	4.60	4.55	4.57
FULL	5.04	4.87	4.96
MEAN	4.82	4.71	4.77

PERMETH(77)	0.00	0.15	MEAN
N(77)			
0	4.96	4.77	4.86
150	4.68	4.65	4.67
MEAN	4.82	4.71	4.77

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GRAIN TONNES/HECTARE

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

PERMETH(77) ALDICARB(77)	0.00	0.15	MEAN
0	5.07	4.90	4.99
10	4.56	4.53	4.55
MEAN	4.82	4.71	4.77

PERMETH(77) FONOFOS(77)	0.00	0.15	MEAN
0	4.83	4.80	4.81
5	4.81	4.63	4.72
MEAN	4.82	4.71	4.77

PERMETH(77) BEN 1(77)	0.00	0.15	MEAN
0	4.76	4.52	4.64
32	4.87	4.90	4.89
MEAN	4.82	4.71	4.77

PIRIMICA(77) IRRIGATN(77)	0.00	0.14	MEAN
NONE	4.62	4.53	4.57
FULL	5.01	4.91	4.96
MEAN	4.81	4.72	4.77

PIRIMICA(77) N(77)	0.00	0.14	MEAN
0	4.85	4.88	4.86
150	4.78	4.56	4.67
MEAN	4.81	4.72	4.77

PIRIMICA(77) ALDICARB(77)	0.00	0.14	MEAN
0	4.92	5.05	4.99
10	4.70	4.39	4.55
MEAN	4.81	4.72	4.77

PIRIMICA(77) FONOFOS(77)	0.00	0.14	MEAN
0	4.91	4.72	4.81
5	4.72	4.72	4.72
MEAN	4.81	4.72	4.77

PIRIMICA(77) BEN 1(77)	0.00	0.14	MEAN
0	4.58	4.70	4.64
32	5.04	4.73	4.89
MEAN	4.81	4.72	4.77

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GRAIN TONNES/HECTARE

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

PIRIMICA(77)	0.00	0.14	MEAN
PERMETH(77)			
0.00	4.84	4.80	4.82
0.15	4.79	4.64	4.71
MEAN	4.81	4.72	4.77

BEN 2(77)	0.0	0.6	MEAN
IRRIGATN(77)			
NONE	4.65	4.50	4.57
FULL	4.84	5.08	4.96
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
N(77)			
0	4.82	4.91	4.86
150	4.67	4.67	4.67
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
ALDICARB(77)			
0	4.94	5.03	4.99
10	4.55	4.55	4.55
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
FONOFOS(77)			
0	4.77	4.85	4.81
5	4.72	4.72	4.72
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
BEN 1(77)			
0	4.59	4.69	4.64
32	4.90	4.88	4.89
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
PERMETH(77)			
0.00	4.78	4.85	4.82
0.15	4.71	4.72	4.71
MEAN	4.74	4.79	4.77

BEN 2(77)	0.0	0.6	MEAN
PIRIMICA(77)			
0.00	4.80	4.82	4.81
0.14	4.69	4.75	4.72
MEAN	4.74	4.79	4.77

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS (INDIVIDUAL VALUES) *****

IRRIGATN(77)	N(77)	ALDICARB(77)	FONOFOS(77)	BEN 1(77)	PERMETH(77)	PIRIMICA(77)	BEN 2(77)	GRAIN
NONE	0	0	0	0	0.00	0.00	0.0	5.49
NONE	0	0	0	0	0.00	0.14	0.6	5.95
NONE	0	0	0	0	0.15	0.00	0.6	4.56
NONE	0	0	0	0	0.15	0.14	0.0	4.01
NONE	0	0	0	32	0.00	0.00	0.6	5.76
NONE	0	0	0	32	0.00	0.14	0.0	5.62
NONE	0	0	0	32	0.15	0.00	0.0	4.88
NONE	0	0	0	32	0.15	0.14	0.6	6.85
NONE	0	0	5	0	0.00	0.00	0.6	4.29
NONE	0	0	5	0	0.00	0.14	0.0	5.73
NONE	0	0	5	0	0.15	0.00	0.0	2.85
NONE	0	0	5	0	0.15	0.14	0.6	4.98
NONE	0	0	5	32	0.00	0.00	0.0	5.28
NONE	0	0	5	32	0.00	0.14	0.6	4.72
NONE	0	0	5	32	0.15	0.00	0.6	3.96
NONE	0	0	5	32	0.15	0.14	0.0	5.83
NONE	0	10	0	0	0.00	0.00	0.6	4.29
NONE	0	10	0	0	0.00	0.14	0.0	4.29
NONE	0	10	0	0	0.15	0.00	0.0	4.97
NONE	0	10	0	0	0.15	0.14	0.6	5.95
NONE	0	10	0	32	0.00	0.00	0.0	5.55
NONE	0	10	0	32	0.00	0.14	0.6	3.04
NONE	0	10	0	32	0.15	0.00	0.6	4.92
NONE	0	10	0	32	0.15	0.14	0.0	4.53
NONE	0	10	5	0	0.00	0.00	0.0	4.33
NONE	0	10	5	0	0.00	0.14	0.6	3.99
NONE	0	10	5	0	0.15	0.00	0.6	4.46
NONE	0	10	5	0	0.15	0.14	0.0	4.58
NONE	0	10	5	32	0.00	0.00	0.6	4.00
NONE	0	10	5	32	0.00	0.14	0.0	5.01
NONE	0	10	5	32	0.15	0.00	0.0	5.25
NONE	0	10	5	32	0.15	0.14	0.6	2.67

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS (INDIVIDUAL VALUES) *****

IRRIGATN(77)	N(77)	ALDICARB(77)	FONOFOS(77)	BEN 1(77)	PERMETH(77)	PIRIMICA(77)	BEN 2(77)	GRAIN
NONE	150	0	0	0	0.00	0.00	0.6	4.88
NONE	150	0	0	0	0.00	0.14	0.0	4.77
NONE	150	0	0	0	0.15	0.00	0.0	5.72
NONE	150	0	0	0	0.15	0.14	0.6	4.32
NONE	150	0	0	32	0.00	0.00	0.0	3.95
NONE	150	0	0	32	0.00	0.14	0.6	4.28
NONE	150	0	0	32	0.15	0.00	0.6	4.80
NONE	150	0	0	32	0.15	0.14	0.0	4.68
NONE	150	0	5	0	0.00	0.00	0.0	4.44
NONE	150	0	5	0	0.00	0.14	0.6	5.24
NONE	150	0	5	0	0.15	0.00	0.6	3.69
NONE	150	0	5	0	0.15	0.14	0.0	5.50
NONE	150	0	5	32	0.00	0.00	0.6	6.15
NONE	150	0	5	32	0.00	0.14	0.0	3.39
NONE	150	0	5	32	0.15	0.00	0.0	6.03
NONE	150	0	5	32	0.15	0.14	0.6	3.96
NONE	150	10	0	0	0.00	0.00	0.0	3.93
NONE	150	10	0	0	0.00	0.14	0.6	5.24
NONE	150	10	0	0	0.15	0.00	0.6	3.90
NONE	150	10	0	0	0.15	0.14	0.0	3.37
NONE	150	10	0	32	0.00	0.00	0.6	3.42
NONE	150	10	0	32	0.00	0.14	0.0	4.24
NONE	150	10	0	32	0.15	0.00	0.0	4.87
NONE	150	10	0	32	0.15	0.14	0.6	3.02
NONE	150	10	5	0	0.00	0.00	0.6	3.40
NONE	150	10	5	0	0.00	0.14	0.0	3.46
NONE	150	10	5	0	0.15	0.00	0.0	4.99
NONE	150	10	5	0	0.15	0.14	0.6	3.78
NONE	150	10	5	32	0.00	0.00	0.0	4.14
NONE	150	10	5	32	0.00	0.14	0.6	4.82
NONE	150	10	5	32	0.15	0.00	0.6	4.60
NONE	150	10	5	32	0.15	0.14	0.0	3.15

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS (INDIVIDUAL VALUES) *****

IRRIGATN(77)	N(77)	ALDICARB(77)	FONOFOS(77)	BEN 1(77)	PERMETH(77)	PIRIMICA(77)	BEN 2(77)	GRAIN
FULL	0	0	0	0	0.00	0.00	0.6	5.69
FULL	0	0	0	0	0.00	0.14	0.0	4.17
FULL	0	0	0	0	0.15	0.00	0.0	4.17
FULL	0	0	0	0	0.15	0.14	0.6	3.78
FULL	0	0	0	32	0.00	0.00	0.0	5.98
FULL	0	0	0	32	0.00	0.14	0.6	6.21
FULL	0	0	0	32	0.15	0.00	0.6	5.26
FULL	0	0	0	32	0.15	0.14	0.0	4.72
FULL	0	0	5	0	0.00	0.00	0.0	6.04
FULL	0	0	5	0	0.00	0.14	0.6	5.22
FULL	0	0	5	0	0.15	0.00	0.6	5.92
FULL	0	0	5	0	0.15	0.14	0.0	5.57
FULL	0	0	5	32	0.00	0.00	0.6	4.09
FULL	0	0	5	32	0.00	0.14	0.0	5.41
FULL	0	0	5	32	0.15	0.00	0.0	3.11
FULL	0	0	5	32	0.15	0.14	0.6	6.56
FULL	0	10	0	0	0.00	0.00	0.0	5.47
FULL	0	10	0	0	0.00	0.14	0.6	4.77
FULL	0	10	0	0	0.15	0.00	0.6	5.93
FULL	0	10	0	0	0.15	0.14	0.0	4.77
FULL	0	10	0	32	0.00	0.00	0.6	5.40
FULL	0	10	0	32	0.00	0.14	0.0	3.01
FULL	0	10	0	32	0.15	0.00	0.0	5.44
FULL	0	10	0	32	0.15	0.14	0.6	4.45
FULL	0	10	5	0	0.00	0.00	0.6	3.95
FULL	0	10	5	0	0.00	0.14	0.0	4.20
FULL	0	10	5	0	0.15	0.00	0.0	2.44
FULL	0	10	5	0	0.15	0.14	0.6	3.94
FULL	0	10	5	32	0.00	0.00	0.0	5.83
FULL	0	10	5	32	0.00	0.14	0.6	5.87
FULL	0	10	5	32	0.15	0.00	0.6	5.56
FULL	0	10	5	32	0.15	0.14	0.0	5.84

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS (INDIVIDUAL VALUES) *****

IRRIGATN(77)	N(77)	ALDICARB(77)	FONOFOS(77)	BEN 1(77)	PERMETH(77)	PIRIMICA(77)	BEN 2(77)	GRAIN
FULL	150	0	0	0	0.00	0.00	0.0	3.74
FULL	150	0	0	0	0.00	0.14	0.6	3.96
FULL	150	0	0	0	0.15	0.00	0.6	3.40
FULL	150	0	0	0	0.15	0.14	0.0	5.60
FULL	150	0	0	32	0.00	0.00	0.6	5.10
FULL	150	0	0	32	0.00	0.14	0.0	5.61
FULL	150	0	0	32	0.15	0.00	0.0	6.04
FULL	150	0	0	32	0.15	0.14	0.6	5.87
FULL	150	0	5	0	0.00	0.00	0.6	5.37
FULL	150	0	5	0	0.00	0.14	0.0	5.45
FULL	150	0	5	0	0.15	0.00	0.0	4.46
FULL	150	0	5	0	0.15	0.14	0.6	5.68
FULL	150	0	5	32	0.00	0.00	0.0	6.16
FULL	150	0	5	32	0.00	0.14	0.6	4.25
FULL	150	0	5	32	0.15	0.00	0.6	6.15
FULL	150	0	5	32	0.15	0.14	0.0	3.78
FULL	150	10	0	0	0.00	0.00	0.6	6.07
FULL	150	10	0	0	0.00	0.14	0.0	5.88
FULL	150	10	0	0	0.15	0.00	0.0	5.19
FULL	150	10	0	0	0.15	0.14	0.6	3.80
FULL	150	10	0	32	0.00	0.00	0.0	3.30
FULL	150	10	0	32	0.00	0.14	0.6	5.38
FULL	150	10	0	32	0.15	0.00	0.6	4.97
FULL	150	10	0	32	0.15	0.14	0.0	4.73
FULL	150	10	5	0	0.00	0.00	0.0	3.71
FULL	150	10	5	0	0.00	0.14	0.6	4.94
FULL	150	10	5	0	0.15	0.00	0.6	4.79
FULL	150	10	5	0	0.15	0.14	0.0	3.61
FULL	150	10	5	32	0.00	0.00	0.6	5.57
FULL	150	10	5	32	0.00	0.14	0.0	5.47
FULL	150	10	5	32	0.15	0.00	0.0	5.91
FULL	150	10	5	32	0.15	0.14	0.6	4.54

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GRAIN TONNES/HECTARE

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

SED 0.144*
0.203**
0.287***

* USE ONLY ON MARGINS OF A TWO WAY TABLE,EXCEPT FOR IRRIGATN(77) .
** USE FOR THE BODY OF A TWO WAY TABLE,ONLY WITHIN THE SAME LEVEL OF IRRIGATN(77) (IF APPLICABLE).
*** USE FOR THREE WAY TABLES (IF CONSTRUCTED FROM INDIVIDUAL VALUES), ONLY WITHIN THE SAME LEVEL OF IRRIGATN(77) (IF APPLICABLE) .
DO NOT USE SED FOR THE FOLLOWING TABLES
ALDICARB(77).FONOFOS(77).BEN 1(77)
N(77).BEN 1(77).PERMETH(77)
N(77).FONOFOS(77).PIRIMICA(77)
ALDICARB(77).PERMETH(77).PIRIMICA(77)
N(77).ALDICARB(77).BEN 2(77)
FONOFOS(77).PERMETH(77).BEN 2(77)
BEN 1(77).PIRIMICA(77).BEN 2(77)
AS NO SED'S ARE AVAILABLE FOR THESE TABLES .

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	27	0.798	16.7

GRAIN MEAN DM% 85.0

SUB PLOT AREA HARVESTED 0.00259

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79/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 (Gaeumannomyces graminis) and yield of following wheat crops - Whittlocks.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The third year, wheat.

For previous years see 77-78/R/CS/202.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.67 x 6.10.

Treatments:

CRP INOC	Crops in 1977 (all wheat 1978 & 1979) and inoculation in 1977 and 1978:
GRASS	Ryegrass
GRASS(I)	Ryegrass + Prg inoculum 1977
OATS	Spring oats
OATS(I)	Spring oats + Prg inoculum 1977
OATS I	Spring oats + Prg inoculum to 1978 wheat
OATS DI	Spring oats + dummy inoculum (sand) to 1978 wheat
WHEAT	Spring wheat
WHEAT(I)	Spring wheat + Prg inoculum 1977

NOTE: Phialophora inoculum was a culture macerated in coarse sand. Coarse sand alone was applied as dummy inoculum.

Basal applications: Manures: (0:20:20) at 250 kg. 'Nitro-Chalk' at 380 kg. Autumn weedkiller: Terbutryne and related triazines at 2.8 kg (as 'Prebane' at 5.6 kg in 220 l). Spring weedkiller: Mecoprop at 2.5 kg in 220 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:- Ploughed: 9 Oct, 1978. Rotary harrowed, seed sown: 11 Oct. Autumn weedkiller applied: 16 Oct. N applied: 23 Apr. Spring weedkiller applied: 15 May. Combine harvested: 30 Aug.

NOTE: Estimates of take-all and Phialophora were made on the crop in April and early July. Bio-assays of soils for take-all and Phialophora were made after harvest, before ploughing.

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GRAIN TONNES/HECTARE

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

CRP INOC	
GRASS	6.99
GRASS(I)	6.78
OATS	6.75
OATS(I)	6.12
OATS I	6.96
OATS DI	6.43
WHEAT	5.73
WHEAT(I)	5.27
MEAN	6.38

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

TABLE	CRP INOC
SED	0.424

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.520	8.1

GRAIN MEAN DM% 86.7

PLOT AREA HARVESTED 0.00116

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79/R/CS/203

SPECIES MIXTURES AND PHIALOPHORA

Object: To study the effects of lucerne, grass and clover, singly and in mixtures, and of soil inoculation on populations of Phialophora radicicola graminicola (Prg) and on take-all (Gaeumannomyces graminis) and yield of following wheat crops - Stubbings.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The third year, wheat; the first year of yields.

Design: 4 randomised blocks of 9 plots, split into 4.

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

1. Whole plots

CRP INOC	Crops in 1977 and 1978 (all wheat 1979) and inoculation:- 1977	1978
C C	White clover	White clover
G G	Ryegrass	Ryegrass
GC GC	Ryegrass/white clover mixture	Ryegrass/white clover
LU LU	Lucerne	Lucerne
LU LU I	Lucerne	Lucerne + Prg inoculum to 1979 wheat
GLU GLU	Ryegrass/lucerne in alternate rows	Ryegrass/lucerne
W G	Spring wheat	Ryegrass, sown into spring wheat stubble
WG G	Spring wheat undersown with ryegrass	Ryegrass
WGI G	Spring wheat, inoculated Prg, undersown with ryegrass	Ryegrass

2. Sub plots

N	Nitrogen fertiliser (kg N) in 1979 only:
0	
50	
100	
150	

NOTES: (1) The inoculum used for the I treatments was an agar culture of Prg mixed with sand. It was broadcast and power harrowed into the soil before sowing.
(2) All lucerne was inoculated with 'Nodulaid'.

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Standard applications: 1977 & 1978:

Nitrogen (kg N):	1977	1978
C C and LU LU	0	0
G G	75 per cut	75 per cut
GC GC	30 per cut	30 per cut
GLU GLU	0	30 per cut
W G and WG G	75 to seedbed	75 per cut

NOTE: The first N per cut was applied to herbage crops in the seedbed in the year of sowing, in spring thereafter. Subsequent dressings were applied after each cut except the last.

PK: (0:14:28) at 690 kg to all plots for 1977. None in 1978. Weedkillers: Glyphosate at 1.8 kg in 220 l to all plots for 1977. MCPB (as 'Tropotox' at 7.0 kg in 340 l) to C, GC, and G treatments for 1977. 2,4-DB at 2.5 kg in 340 l to LU and GLU treatments for 1977. None in 1978.

Varieties and seed rates (kg) 1977:

	Grass RvP	Clover Blanca	Lucerne Vertus	S. wheat Sappo
C	-	11	-	-
G	22	-	-	-
GC	22	2.2	-	-
LU	-	-	13	-
GLU	11	-	13	-
W	-	-	-	190
WG	22	-	-	190

NOTE: GC: Grass and clover seeds were mixed. GLU: Grass and lucerne seeds were sown in alternate rows.

Varieties and seed rate 1978: Only grass was sown in 1978; W G: RvP sown at 22 kg.

Cultivations, etc. for 1977:- Glyphosate applied: 20 Sept, 1976. Ploughed: 29 Oct. Spring-tine cultivated: 5 Apr, 1977. PK applied: 6 Apr. Spring-tine cultivated, power harrowed for W and WG only: 7 Apr. Power harrowed for G, rolled G, W and WG: 8 Apr. Seed sown for G, W and WG: 9 Apr. First standard N applied: 19 May. LU, C, GC and GLU power harrowed, G and GC sown: 27 May. LU and GLU sown: 1 June. G and GC cut: 21 July. N applied to G only: 27 July. 'Tropotox' applied: 28 July. 2,4-DB applied: 4 Aug. All wheat cut green: 5 Aug. All plots cut: 8 Nov. Previous cropping: Potatoes 1975, wheat 1976.

Cultivations, etc. for 1978:- W G heavy spring-tine cultivated: 16 Sept, 1977. W G disc harrowed twice: 28 Sept. Seed sown for W G treatments: 3 Oct. N applied: 20 Mar, 1978. Grass cut, N applied (as 'Nitra-Shell 34'): 9 June. Grass cut: 24 July.

Basal applications for 1979: Manures: (0:20:20) at 250 kg, combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 220 l. Mecoprop at 2.5 kg and isoproturon at 2.2 kg in 220 l.

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Seed for 1979: Flanders, sown at 200 kg.

Cultivations for 1979: Paraquat applied: 3 Aug, 1978. Heavy spring-tine cultivated: 10 Aug (twice), 25 Aug, 8 Sept, 15 Sept. Power harrowed: 10 Oct. Seed sown: 11 Oct. N applied to half of site: 12 Apr, 1979. N applied to remaining plots: 17 Apr. Isoproturon and mecoprop applied: 9 May. Combine harvested: 30 Aug.

NOTE: Estimates of take-all and Phialophora were made on crop in April and early July. Bio-assays of soils for take-all and Phialophora were made after harvest, before ploughing.

GRAIN TONNES/HECTARE

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

N	0	50	100	150	MEAN
CRP INOC					
C C	4.46	6.46	7.88	8.28	6.77
G G	3.99	5.49	6.50	6.62	5.65
GC GC	3.64	5.82	6.76	6.86	5.77
LU LU	4.33	6.25	7.43	7.49	6.38
LU LU I	4.13	6.40	7.72	7.78	6.51
GLU GLU	3.47	5.69	6.56	7.70	5.86
W G	3.63	5.41	6.12	6.98	5.54
WG G	3.23	5.29	5.75	6.46	5.18
WGI G	3.55	5.61	6.31	6.61	5.52
MEAN	3.83	5.83	6.78	7.20	5.91

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

TABLE	CRP INOC	N	CRP INOC N
SED	0.264	0.144	0.458
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
CRP INOC			0.432

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.374	6.3
BLOCK.WP.SP	81	0.611	10.3

GRAIN MEAN DM% 86.1

SUB PLOT AREA HARVESTED 0.00127

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79/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 third year, white clover, ryegrass.

For previous years see 77-78/R/CS/204

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

3. NITROGEN — Nitrogen fertiliser (kg N as (20:14:14)):

N 1	100 in spring
N 2	100 in spring + 50 after each cut except the last

NOTES: (1) Aldicarb was applied on 2 Apr, 1979 and 10 Aug
(2) Benomyl was applied on 8 Jan and 26 Feb
(3) Phorate and metaldehyde were applied on 6 June, 5 July, 10 Aug, 14 Sept.

Standard applications: Weedkillers (to S.23 only): Dicamba with mecoprop and MCPA (as 'Tetralex Plus' at 6.7 kg) in 220 l.

Cultivations, etc.:- Spring NPK applied: 23 Mar, 1979. Cut: 1 June, 4 July, 8 Aug, 13 Sept, 18 Oct. NPK applied: 1 June, 4 July, 8 Aug, 13 Sept.

NOTE: The proportions of grass and clover, and monocotyledonous and dicotyledonous weeds were determined at each cut. Plots were vacuum sampled for insect pests at monthly intervals during the season.

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79/R/CS/204

1ST CUT (1/6/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	4.54	4.25	4.26	4.42	4.37
S23/BLAN	4.81	5.00	4.85	4.74	4.85
S23/KWW	4.93	5.13	4.58	4.90	4.88
S23/LAD	4.08	4.09	4.40	4.23	4.20
S23/MIL	4.61	4.90	5.11	5.17	4.95
MEAN	4.59	4.68	4.64	4.69	4.65

NITROGEN VARIETY	N 1	N 2	MEAN
S23	3.48	5.26	4.37
S23/BLAN	4.60	5.10	4.85
S23/KWW	4.67	5.10	4.88
S23/LAD	3.93	4.47	4.20
S23/MIL	4.86	5.04	4.95
MEAN	4.31	4.99	4.65

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	4.29	4.90	4.59
ALDICARB	4.20	5.16	4.68
BENOMYL	4.67	4.61	4.64
PHOR+MET	4.07	5.31	4.69
MEAN	4.31	4.99	4.65

VARIETY	NITROGEN CHEMICAL	N 1	N 2
S23	NONE	3.47	5.60
	ALDICARB	3.71	4.79
	BENOMYL	3.36	5.16
	PHOR+MET	3.37	5.47
S23/BLAN	NONE	4.54	5.09
	ALDICARB	4.79	5.22
	BENOMYL	4.91	4.79
	PHOR+MET	4.17	5.30
S23/KWW	NONE	5.27	4.59
	ALDICARB	4.42	5.84
	BENOMYL	4.65	4.50
	PHOR+MET	4.33	5.47
S23/LAD	NONE	3.75	4.41
	ALDICARB	3.86	4.33
	BENOMYL	4.33	4.47
	PHOR+MET	3.78	4.68
S23/MIL	NONE	4.43	4.79
	ALDICARB	4.20	5.61
	BENOMYL	6.10	4.12
	PHOR+MET	4.70	5.63

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79/R/CS/204

1ST CUT (1/6/79) DRY MATTER TONNES/HECTARE

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.243	0.217	0.154	0.486

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.343	0.307	0.687

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.687	14.8

1ST CUT MEAN DM% 15.4

2ND CUT (4/7/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	2.04	1.61	1.72	2.26	1.91
S23/BLAN	2.69	2.99	2.70	2.99	2.84
S23/KWW	2.13	2.60	2.60	2.57	2.48
S23/LAD	2.45	2.76	2.60	2.85	2.66
S23/MIL	2.72	2.89	3.10	2.96	2.92
MEAN	2.40	2.57	2.55	2.73	2.56

NITROGEN VARIETY	N 1	N 2	MEAN
S23	2.04	1.78	1.91
S23/BLAN	2.93	2.75	2.84
S23/KWW	2.56	2.39	2.48
S23/LAD	2.73	2.60	2.66
S23/MIL	3.04	2.79	2.92
MEAN	2.66	2.46	2.56

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	2.45	2.36	2.40
ALDICARB	2.67	2.47	2.57
BENOMYL	2.67	2.42	2.55
PHOR+MET	2.85	2.60	2.73
MEAN	2.66	2.46	2.56

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2ND CUT (4/7/79) DRY MATTER TONNES/HECTARE

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

VARIETY	NITROGEN / CHEMICAL	N 1	N 2
S23	NONE	2.03	2.04
	ALDICARB	1.56	1.67
	BENOMYL	1.95	1.50
	PHOR+MET	2.60	1.93
S23/BLAN	NONE	2.80	2.58
	ALDICARB	3.15	2.83
	BENOMYL	2.80	2.59
	PHOR+MET	2.99	3.00
S23/KWW	NONE	2.04	2.22
	ALDICARB	2.85	2.35
	BENOMYL	2.62	2.58
	PHOR+MET	2.73	2.41
S23/LAD	NONE	2.55	2.35
	ALDICARB	2.92	2.60
	BENOMYL	2.65	2.56
	PHOR+MET	2.82	2.88
S23/MIL	NONE	2.84	2.60
	ALDICARB	2.88	2.89
	BENOMYL	3.34	2.86
	PHOR+MET	3.13	2.80

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.104	0.093	0.066	0.208

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.147	0.131	0.294

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.294	11.5

2ND CUT MEAN DM% 17.3

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3RD CUT (8/8/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	0.51	0.51	0.55	0.52	0.52
S23/BLAN	0.96	1.02	0.74	1.02	0.94
S23/KWW	0.71	0.79	0.61	0.80	0.73
S23/LAD	0.94	1.02	1.04	1.28	1.07
S23/MIL	1.03	1.00	0.98	1.11	1.03
MEAN	0.83	0.87	0.79	0.95	0.86

NITROGEN VARIETY	N 1	N 2	MEAN
S23	0.34	0.70	0.52
S23/BLAN	0.88	0.99	0.94
S23/KWW	0.70	0.75	0.73
S23/LAD	1.01	1.12	1.07
S23/MIL	1.06	1.00	1.03
MEAN	0.80	0.91	0.86

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	0.77	0.88	0.83
ALDICARB	0.79	0.94	0.87
BENOMYL	0.71	0.86	0.79
PHOR+MET	0.92	0.97	0.95
MEAN	0.80	0.91	0.86

VARIETY	NITROGEN CHEMICAL	N 1	N 2
S23	NONE	0.33	0.68
	ALDICARB	0.37	0.65
	BENOMYL	0.30	0.80
	PHOR+MET	0.37	0.67
S23/BLAN	NONE	0.99	0.92
	ALDICARB	0.85	1.19
	BENOMYL	0.68	0.81
	PHOR+MET	1.01	1.04
S23/KWW	NONE	0.62	0.79
	ALDICARB	0.77	0.80
	BENOMYL	0.62	0.61
	PHOR+MET	0.81	0.79
S23/LAD	NONE	0.90	0.97
	ALDICARB	0.94	1.10
	BENOMYL	1.02	1.06
	PHOR+MET	1.20	1.36
S23/MIL	NONE	1.02	1.05
	ALDICARB	1.05	0.95
	BENOMYL	0.96	1.01
	PHOR+MET	1.22	1.01

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3RD CUT (8/8/79) DRY MATTER TONNES/HECTARE

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.072	0.065	0.046	0.145

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.102	0.092	0.205

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.205	23.9

3RD CUT MEAN DM% 28.7

4TH CUT (13/9/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	1.06	1.08	0.90	1.26	1.07
S23/BLAN	1.38	1.52	1.33	1.51	1.43
S23/KWW	1.31	1.65	1.12	1.78	1.46
S23/LAD	1.68	1.80	1.80	1.92	1.80
S23/MIL	1.32	1.55	1.41	1.58	1.47
MEAN	1.35	1.52	1.31	1.61	1.45

NITROGEN VARIETY	N 1	N 2	MEAN
S23	0.68	1.47	1.07
S23/BLAN	1.37	1.50	1.43
S23/KWW	1.36	1.57	1.46
S23/LAD	1.79	1.81	1.80
S23/MIL	1.44	1.49	1.47
MEAN	1.33	1.57	1.45

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	1.28	1.42	1.35
ALDICARB	1.37	1.68	1.52
BENOMYL	1.17	1.45	1.31
PHOR+MET	1.49	1.72	1.61
MEAN	1.33	1.57	1.45

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4TH CUT (13/9/79) DRY MATTER TONNES/HECTARE

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

VARIETY	NITROGEN / CHEMICAL	N 1	N 2
S23	NONE	0.71	1.41
	ALDICARB	0.68	1.48
	BENOMYL	0.46	1.34
	PHOR+MET	0.87	1.64
S23/BLAN	NONE	1.32	1.44
	ALDICARB	1.56	1.49
	BENOMYL	1.17	1.48
	PHOR+MET	1.43	1.59
S23/KWW	NONE	1.39	1.23
	ALDICARB	1.43	1.88
	BENOMYL	1.03	1.21
	PHOR+MET	1.59	1.96
S23/LAD	NONE	1.67	1.69
	ALDICARB	1.73	1.87
	BENOMYL	1.85	1.76
	PHOR+MET	1.90	1.94
S23/MIL	NONE	1.32	1.31
	ALDICARB	1.45	1.66
	BENOMYL	1.34	1.48
	PHOR+MET	1.67	1.49

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.066	0.059	0.042	0.132

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.093	0.083	0.186

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.186	12.9

4TH CUT MEAN DM% 26.6

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5TH CUT (18/10/79) DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	0.42	0.38	0.37	0.46	0.41
S23/BLAN	0.40	0.47	0.41	0.50	0.45
S23/KWW	0.33	0.58	0.41	0.53	0.46
S23/LAD	0.50	0.67	0.53	0.61	0.58
S23/MIL	0.38	0.46	0.34	0.55	0.43
MEAN	0.41	0.51	0.41	0.53	0.47

NITROGEN VARIETY	N 1	N 2	MEAN
S23	0.19	0.63	0.41
S23/BLAN	0.35	0.54	0.45
S23/KWW	0.31	0.62	0.46
S23/LAD	0.51	0.65	0.58
S23/MIL	0.35	0.51	0.43
MEAN	0.34	0.59	0.47

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	0.29	0.52	0.41
ALDICARB	0.38	0.64	0.51
BENOMYL	0.32	0.50	0.41
PHOR+MET	0.38	0.68	0.53
MEAN	0.34	0.59	0.47

VARIETY	NITROGEN CHEMICAL	N 1	N 2
S23	NONE	0.19	0.65
	ALDICARB	0.19	0.57
	BENOMYL	0.16	0.58
	PHOR+MET	0.22	0.70
S23/BLAN	NONE	0.34	0.47
	ALDICARB	0.32	0.63
	BENOMYL	0.33	0.50
	PHOR+MET	0.43	0.57
S23/KWW	NONE	0.20	0.47
	ALDICARB	0.41	0.75
	BENOMYL	0.30	0.52
	PHOR+MET	0.32	0.75
S23/LAD	NONE	0.41	0.59
	ALDICARB	0.58	0.76
	BENOMYL	0.53	0.54
	PHOR+MET	0.52	0.71
S23/MIL	NONE	0.31	0.45
	ALDICARB	0.40	0.51
	BENOMYL	0.30	0.38
	PHOR+MET	0.41	0.68

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79/R/CS/204

5TH CUT (18/10/79) DRY MATTER TONNES/HECTARE

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.035	0.031	0.022	0.069

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.049	0.044	0.098

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.098	21.0

5TH CUT MEAN DM% 19.3

TOTAL OF 5 CUTS DRY MATTER TONNES/HECTARE

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

CHEMICAL VARIETY	NONE	ALDICARB	BENOMYL	PHOR+MET	MEAN
S23	8.56	7.83	7.80	8.92	8.28
S23/BLAN	10.24	11.01	10.03	10.76	10.51
S23/KWW	9.42	10.75	9.32	10.58	10.02
S23/LAD	9.64	10.35	10.38	10.89	10.32
S23/MIL	10.06	10.79	10.95	11.36	10.79
MEAN	9.58	10.15	9.70	10.50	9.98

NITROGEN VARIETY	N 1	N 2	MEAN
S23	6.72	9.83	8.28
S23/BLAN	10.14	10.88	10.51
S23/KWW	9.60	10.43	10.02
S23/LAD	9.97	10.66	10.32
S23/MIL	10.76	10.82	10.79
MEAN	9.44	10.52	9.98

NITROGEN CHEMICAL	N 1	N 2	MEAN
NONE	9.09	10.08	9.58
ALDICARB	9.41	10.88	10.15
BENOMYL	9.55	9.84	9.70
PHOR+MET	9.71	11.29	10.50
MEAN	9.44	10.52	9.98

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TOTAL OF 5 CUTS DRY MATTER TONNES/HECTARE

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

VARIETY	NITROGEN CHEMICAL	N 1	N 2
S23	NONE	6.73	10.39
	ALDICARB	6.51	9.16
	BENOMYL	6.23	9.37
	PHOR+MET	7.43	10.41
S23/BLAN	NONE	9.99	10.50
	ALDICARB	10.67	11.35
	BENOMYL	9.89	10.17
	PHOR+MET	10.02	11.51
S23/KWW	NONE	9.53	9.31
	ALDICARB	9.88	11.61
	BENOMYL	9.21	9.42
	PHOR+MET	9.78	11.38
S23/LAD	NONE	9.27	10.01
	ALDICARB	10.03	10.66
	BENOMYL	10.37	10.39
	PHOR+MET	10.22	11.57
S23/MIL	NONE	9.91	10.20
	ALDICARB	9.98	11.61
	BENOMYL	12.04	9.86
	PHOR+MET	11.11	11.61

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

TABLE	VARIETY	CHEMICAL	NITROGEN	VARIETY CHEMICAL
SED	0.2880	0.2576	0.1821	0.5759

TABLE	VARIETY NITROGEN	CHEMICAL NITROGEN	VARIETY CHEMICAL NITROGEN
SED	0.4072	0.3643	0.8145

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

STRATUM	DF	SE	CV%
BLOCK.WP	39	0.8145	8.2

TOTAL OF 5 CUTS MEAN DM% 21.5

AVERAGE PLOT AREA HARVESTED 0.00053

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79/R/CS/211

FACTORS AFFECTING EYESPOT

Object: To study the effects of a range of treatments on the incidence of eyespot (Pseudocercosporella herpotrichoides) and on the yield of wheat - Meadow.

Sponsors: R.D. Prew, A. Bainbridge.

The second year, wheat.

For previous year see 78/R/CS/211.

Design: 2 randomised blocks of 2 whole plots split into 6 sub plots split into 3 sub sub plots.

Whole plot dimensions: 94.0 x 9.14.

Treatments: All combinations of:-

Whole plots

1. STRAW	Treatment of straw in autumn 1977 & 1978:	
	BURNT	Burnt on site after spreading
	CARTED	Baled and carted off

Sub plots

2. DRILLING	Cultivations and drilling in autumn 1977 & 1978:	
	CNVNTIAL	Cultivated and conventionally drilled
	DIRECT	Uncultivated, direct drilled
3. SOW DATE	Dates of sowing, autumn 1978:	
	26 SEPT	26 September
	12 OCT	12 October
	10 NOV	10 November

Sub sub plots

4. SEEDRATE	Seed rates, autumn 1978 (kg):	
	100	
	150	
	200	

NOTE: All treatments involving the combinations of STRAW CARTED & DRILLING DIRECT were severely infested with sterile brome grass and were cut green, no yields, on 18 June. Regrowth was cut again on 23 July.

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79/R/CS/211

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 500 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Methabenzthiazuron at 1.6 kg in 220 l. Mecoprop at 2.5 kg in 220 l.

Seed: Kador.

Cultivations, etc.:- Straw treatments applied: 9-12 Sept, 1978. Unburnt stubble cut and removed: 20 Sept. Paraquat applied: 22 Sept. CNVNTIAL treatments ploughed, and CNVNTIAL 26 SEPT treatments rotary harrowed, seed sown for all 26 SEPT treatments, CNVNTIAL treatments tine harrowed in, DIRECT treatments disc harrowed in and rolled: 26 Sept. CNVNTIAL 12 OCT treatments rotary harrowed, all 12 OCT treatments sown, CNVNTIAL treatments tine harrowed in, DIRECT treatments disc harrowed in and both treatments rolled: 12 Oct. CNVNTIAL 10 NOV treatments rotary harrowed, all 10 NOV treatments sown, CNVNTIAL treatments tine harrowed in, DIRECT treatments disc harrowed in and both treatments rolled: 10 Nov. Methabenzthiazuron applied: 11 Nov. N applied: 18 Apr, 1979. Mecoprop applied: 9 May. Combine harvested: 30 Aug. Previous crops: Wheat 1977 and 1978.

NOTE: Plants were assessed for infection with eyespot and the incidence of eyespot spores was measured throughout the year. Take-all was assessed at harvest.

GRAIN TONNES/HECTARE

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

SOW DATE	26 SEPT	12 OCT	10 NOV	MEAN
STRAW DRILLING				
BURNT CNVNTIAL	5.14	5.29	4.53	4.98
BURNT DIRECT	5.96	5.75	5.58	5.76
CARTED CNVNTIAL	5.94	5.44	4.90	5.43
MEAN	5.68	5.49	5.00	5.39

SEEDRATE	100	150	200	MEAN
STRAW DRILLING				
BURNT CNVNTIAL	4.90	4.99	5.07	4.98
BURNT DIRECT	5.59	5.68	6.01	5.76
CARTED CNVNTIAL	5.36	5.48	5.44	5.43
MEAN	5.28	5.38	5.51	5.39

SEEDRATE	100	150	200	MEAN
SOW DATE				
26 SEPT	5.73	5.52	5.78	5.68
12 OCT	5.30	5.57	5.60	5.49
10 NOV	4.81	5.05	5.14	5.00
MEAN	5.28	5.38	5.51	5.39

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79/R/CS/211

GRAIN TONNES/HECTARE

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

STRAW DRILLING	SEEDRATE SOW DATE	100	150	200
BURNT CNVNTIAL	26 SEPT	5.29	4.99	5.14
	12 OCT	5.18	5.44	5.24
	10 NOV	4.23	4.55	4.82
BURNT DIRECT	26 SEPT	5.72	5.59	6.55
	12 OCT	5.61	5.79	5.85
	10 NOV	5.45	5.65	5.63
CARTED CNVNTIAL	26 SEPT	6.18	5.99	5.65
	12 OCT	5.13	5.47	5.72
	10 NOV	4.77	4.97	4.96

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

TABLE	SOW DATE	SEEDRATE	STRAW* DRILLING	SOW DATE SEEDRATE
SED	0.255	0.127	0.255	0.312
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOW DATE				0.221

TABLE	STRAW* DRILLING SOW DATE	STRAW* DRILLING SEEDRATE	STRAW* DRILLLING SEEDRATE SOW DATE
SED	0.442	0.312	0.541
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
STRAW.DRILLING		0.221	
STRAW.DRILLING.SOW DATE			0.382

* WITHIN THE SAME LEVEL OF STRAW ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	7	0.442	8.2
BLOCK.WP.SP.SSP	18	0.382	7.1

GRAIN MEAN DM% 87.7

SUB PLOT AREA HARVESTED

DRILLING CNVNTIAL 0.00253
DRILLING DIRECT 0.00248

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79/R/CS/212

SEASONAL EFFECTS OF TAKE-ALL

Object: To study the incidence of take-all (Gaeumannomyces graminis) in continuous wheat and in first and second wheats after a break - Great Harpenden I.

Sponsor: D. Hornby.

The second year, beans, wheat.

For previous year see 78/R/CS/212.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 5.33 x 31.39.

Treatments:

CRP SEQ	Crop sequences:					
	1978	1979	1980	1981	1982	1983
1	W	W	W	W	W	W
2	W	BE	W	W	BE	W
3	W	W	BE	W	W	BE
4	BE	W	W	BE	W	W

BE = spring beans, W = wheat

NOTE: Yields are recorded from wheat only, and means are presented for the separate sequences although treatments of CRP SEQ 1 and 3 do not yet differ.

Standard applications:-
Wheat: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 350 kg. Weedkiller: Mecoprop at 2.5 kg in 220 l.
Beans: Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Wheat: Flanders, sown at 190 kg.
Beans: Minden, sown at 220 kg.

Cultivations, etc.:-
All plots: Ploughed: 13 Oct, 1978.
Wheat: Rotary harrowed, seed sown: 16 Oct, 1978. N applied: 23 Apr, 1979. Weedkiller applied: 10 May. Combine harvested: 29 Aug.
Beans: Rotary harrowed, seed sown: 23 Apr, 1979. Tractor hoed: 6 June. Insecticide applied: 22 June. Combine harvested: 20 Sept.

NOTE: Soil and plant samples were taken throughout the season. An additional soil sample was taken after harvest. Samples were assessed for take-all.

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79/R/CS/212

WHEAT

GRAIN TONNES/HECTARE

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

CRP SEQ	1	3	4	MEAN
	5.83	5.70	7.03	6.19

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

TABLE	CRP SEQ
SED	0.136

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.166	2.7

GRAIN MEAN DM% 85.6

PLOT AREA HARVESTED 0.00434

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79/R/CS/216 and 79/W/CS/216

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of subsoiling and of incorporating a large dressing of PK in the subsoil on yields and nutrient uptakes of a sequence of crops - Rothamsted (R) Delharding and Woburn (W) Road Piece.

Sponsors: J. McEwen, A.E. Johnston (R), M.K.V. Carr, R.J. Godwin (National College of Agricultural Engineering), P.T. Gooderham, I.B. Warboys, J.M. Wilkes (Wye College).

The second year, beans.

For previous year see 78/R&W/CS/216.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments (applied autumn 1977 only, before spring barley 1978):

TREATMNT	Machines and incorporation of P and K into the subsoil:
NONE	Not subsoiled, no P or K
FARM 0	Farm standard, unwinged, subsoiler, no P or K
NCAE 0	N.C.A.E. winged subsoiler, no P or K
NCAE PK	N.C.A.E. winged subsoiler, P and K applied
WYE 0	Wye double digger, no P or K
WYE PK	Wye double digger, P and K applied

NOTES: (1) The rates of P and K were 1930 kg P_2O_5, as triple superphosphate and 460 kg K_2O as muriate of potash.
(2) The Farm standard, unwinged, subsoiler was set to work at a depth of 38 cm at intervals of 50 cm Delharding (R) and at a depth of 50 cm at intervals of 70 cm Road Piece (W).
(3) The N.C.A.E. winged subsoiler was set to work at a depth of 40 cm at intervals of 60 cm on plots not given P and K and at alternate depths of 30 cm and 40 cm spaced 30 cm apart on plots given P and K. Fertiliser was applied behind the subsoiling points.
(4) The Wye double digger turns a furrow with a conventional plough to a depth of 23 cm, and at the same time rotary cultivates the bottom of the furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.

Basal applications:
Delharding (R): Weedkillers: Glyphosate at 1.5 kg in 220 l. Trietazine with simazine ('Remtal SC' at 2.8 kg in 220 l). Insecticide: Pirimicarb at 0.14 kg in 220 l.
Road Piece (W): Weedkillers: Diquat at 0.79 kg ion in 280 l. Trietazine with simazine ('Remtal SC' at 2.4 kg in 280 l). Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Minden, sown at 220 kg on both sites.

Cultivations, etc.:-
Delharding (R): Glyphosate applied: 24 Oct, 1978. Ploughed: 16 Nov. Heavy spring-tine cultivated: 20 Apr, 1979. Rotary harrowed: 21 Apr. Seed sown: 23 Apr. Trietazine with simazine applied: 13 May. Insecticide applied: 22 June. Combine harvested: 21 Sept.

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79/R/CS/216 and 79/W/CS/216

Road Piece (W): Diquat applied: 8 Sept, 1978. Heavy spring-tine cultivated: 13 Sept. Ploughed: 16 Nov. Spring-tine cultivated with crumbler attached: 16 Apr, 1979. Seed sown: 19 Apr. Trietazine with simazine applied: 1 May. Insecticide applied: 22 June. Combine harvested: 10 Sept.

NOTES: (1) On Road Piece (W) water use was measured during the season using a neutron probe.
(2) On both sites samples were taken at intervals during the season to measure above-ground dry matter and nutrient uptake. Grain samples were analysed for N, P, K, Ca, Na and Mg.

79/R/CS/216 DELHARDING (R)

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	FARM 0	NCAE 0	NCAE PK	WYE 0	WYE PK	MEAN
	3.61	3.61	3.66	3.49	3.76	4.10	3.71

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

TABLE	TREATMNT
SED	0.201

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.247	6.7

GRAIN MEAN DM% 80.3 PLOT AREA HARVESTED 0.00300

79/W/CS/216 ROAD PIECE (W)

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	FARM 0	NCAE 0	NCAE PK	WYE 0	WYE PK	MEAN
	1.41	1.22	1.33	1.29	1.52	1.89	1.44

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

TABLE	TREATMNT
SED	0.375

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.460	31.9

GRAIN MEAN DM% 87.3 PLOT AREA HARVESTED 0.00260

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79/R/CS/223

LATE N

Object: To study the residual effects on wheat of a range of fertilisers applied to potatoes in 1978 - Long Hoos III.

Sponsors: T.M. Addiscott, J. Ashworth, A. Penny, F.V. Widdowson.

The second year, wheat.

For previous year see 78/R/CS/223.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 9.14 x 4.27.

Treatments: All combinations of:-

1. N FORM(78) Forms of nitrogen fertiliser in 1978:

AA	Aqueous ammonia, injected before planting
AA+NITRA	Aqueous ammonia + nitrapyrin at 1.1 kg, injected before planting
AA+STC	Aqueous ammonia + sodium trithiocarbonate at 22 kg injected before planting
AU	Aqueous urea, injected before planting
AN E	Ammonium nitrate, all to the seedbed
AN E+L	Ammonium nitrate, half to the seedbed, half top-dressed
IBDU	Isobutylidene diurea, medium granules all to the seedbed

2. N RATE(1) Rates of nitrogen fertiliser in 1978 (kg N):

200
300

plus four extra treatments given ammonium nitrate, all to the seedbed in 1978 (kg N):

EXTRA

AN E 150
AN E 250
AN E 350
AN E 400

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 370 kg. Weedkillers: Mecoprop at 2.5 kg in 220 l. Growth regulator: Chlormequat at 1.7 kg in 220 l.

Seed: Flanders, sown at 190 kg.

Cultivations, etc.:- Heavy spring-tine cultivated twice: 26 Oct, 1978. Seed sown: 27 Oct. N applied: 30 Apr, 1979. Weedkiller applied: 9 May. Growth regulator applied: 1 June. Combine harvested: 29 Aug.

NOTE: Grain samples were taken for N determinations.

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79/R/CS/223

GRAIN TONNES/HECTARE

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

N RATE(1) / N FORM	200	300	MEAN
AA	6.30	6.42	6.36
AA+NITRA	6.51	6.40	6.45
AA+STC	6.40	6.47	6.44
AU	6.41	6.57	6.49
AN E	6.53	6.44	6.49
AN E+L	6.39	6.59	6.49
IBDU	6.71	6.59	6.65
MEAN	6.47	6.50	6.48

EXTRA	AN E 150	AN E 250	AN E 350	AN E 400	MEAN
	6.25	6.52	6.57	6.70	6.51

GRAND MEAN 6.49

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

TABLE	EXTRA	N FORM	N RATE(1)	N FORM N RATE(1) & EXTRA
SED	0.145	0.102	0.055	0.145

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.177	2.7

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00290

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79/R/CS/232

AQUEOUS UREA AND NITRIFICATION INHIBITORS

Object: To study the residual effects of adding nitrification inhibitors to liquid fertilisers on the yield and nitrogen uptake of grass cut for silage - Rothamsted (R) Great Harpenden I.

Sponsors: J. Ashworth, A. Penny, M.V. Hewitt.

The second year, ley.

For previous year see 78/R/G/1.

Design: 2 randomised blocks of 28 plots.

Whole plot dimensions: 2.43 x 9.14.

Treatments (applied for the 1978 crop only, no fresh treatments applied for 1979): All combinations of:-

1. U T1 N	Rates of nitrogen fertiliser applied as aqueous urea as a single application, injection tines spaced 30 cm apart (kg N):
2	250
3	375
2. N TIME	Times of applying aqueous urea:
AUTUMN	25 Nov, 1977
SPRING	10 Mar, 1978
3. NI FORM	Forms of nitrification inhibitors added to aqueous urea:
NONE	None
NITRAPYR	Nitrapyrin
SOD TRI	Sodium trithiocarbonate
NIT CS	Nitrapyrin + carbon disulphide

plus twelve extra treatments:

EXTRA

Aqueous urea, tines spaced 60 cm apart, no inhibitors:

UT2 N2A	Supplying 250 kg N in autumn
UT2 N2S	Supplying 250 kg N in spring
UT2 N3A	Supplying 375 kg N in autumn
UT2 N3S	Supplying 375 kg N in spring

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79/R/CS/232

Aqueous urea + ammonium nitrate, tines spaced 30 cm apart, supplying 375 kg N applied in spring

UATIN3SO	No nitrification inhibitor
UATIN3ST	Sodium trithiocarbonate
UATIN3SN	Nitrapyrin
UATIN3SM	Mixture of nitrapyrin and carbon disulphide

'Nitro-Chalk', dressing divided (kg N total):

NC N2	250
NC N3	375
NC N4	500
NONE	None

Basal applications: Manures: (0:14:28) at 500 kg. N at 30 kg as 'Nitro-Chalk'.

Cultivations, etc.: Grass cut (no yields) 14 Nov, 1978. PK applied: 16 Nov. N applied: 12 Apr, 1979. Grass cut: 4 June.

NOTE: Grass samples were assessed for N content.

1ST AND ONLY CUT (4/6/79) DRY MATTER TONNES/HECTARE

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

TABLE	EXTRA	U TI N	N TIME	NI FORM
SED	0.270	0.095	0.095	0.135

TABLE	U TI N N TIME	U TI N NI FORM	N TIME NI FORM	U TI N N TIME NI FORM &EXTRA
SED	0.135	0.191	0.191	0.270

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.270	12.4

PLOT AREA HARVESTED 0.00078

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79/R/CS/232

1ST AND ONLY CUT (4/6/79) DRY MATTER TONNES/HECTARE

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

N TIME	AUTUMN	SPRING	MEAN
U T1 N			
2	1.81	2.00	1.91
3	2.23	2.05	2.14
MEAN	2.02	2.03	2.02

NI FORM	NONE	NITRAPYR	SOD TRI	NIT CS	MEAN
U T1 N					
2	1.84	2.06	1.92	1.80	1.91
3	1.98	2.12	2.31	2.15	2.14
MEAN	1.91	2.09	2.11	1.98	2.02

NI FORM	NONE	NITRAPYR	SOD TRI	NIT CS	MEAN
N TIME					
AUTUMN	1.81	2.06	2.17	2.04	2.02
SPRING	2.02	2.12	2.06	1.91	2.03
MEAN	1.91	2.09	2.11	1.98	2.02

	NI FORM	NONE	NITRAPYR	SOD TRI	NIT CS
U T1 N	N TIME				
2	AUTUMN	1.73	1.97	1.81	1.74
	SPRING	1.96	2.16	2.02	1.86
3	AUTUMN	1.89	2.16	2.53	2.34
	SPRING	2.07	2.08	2.09	1.96

EXTRA	
UT2 N2A	1.93
UT2 N2S	1.85
UT2 N3A	2.16
UT2 N3S	2.29
UATIN3SO	1.98
UATIN3ST	1.90
UATIN3SN	2.17
UATIN3SM	2.66
NC N2	3.11
NC N3	2.86
NC N4	3.83
NONE	1.79
MEAN	2.38

GRAND MEAN 2.17

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79/W/CS/239

LATE N

Object: To study the effects of a range of fertilisers that release nitrogen later in the growing season than traditional forms on the growth and yield of potatoes - Horsepool.

Sponsors: F.V. Widdowson, A. Penny, J. Ashworth, T.M. Addiscott.

The first year, potatoes.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 4.27 x 13.1.

Treatments: All combinations of:-

1. N FORM — Forms of nitrogen fertiliser:

AQ U	Aqueous urea, injected before planting
AQ U+CS2	Aqueous urea + carbon disulphide at 10.0 kg, injected before planting
AQ U+NIT	Aqueous urea + nitrapyrin at 1.0 kg, injected before planting
NC E	'Nitro-Chalk', all to the seedbed
NC E+L	'Nitro-Chalk', half to the seedbed, half in June
IBDU	Isobutylidene diurea, all to the seedbed

2. N RATE(1) — Rates of nitrogen fertiliser (kg N):

200
300

plus four extra treatments all given 'Nitro-Chalk':

EXTRA

NC E100	At 100 kg N, all to the seedbed
NC E400	At 400 kg N, all to the seedbed
NC EL100	At 100 kg N, half to the seedbed, half in June
NC EL400	At 400 kg N, half to the seedbed, half in June

NOTE: Aqueous fertilisers were injected on 3 May, 1979, IBDU and 'Nitro-Chalk' were applied on 4 May. Late 'Nitro-Chalk' was applied on 18 June.

Basal applications: Manures: (0:14:28) at 1880 kg. Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l on six occasions with insecticide on the first two. Insecticide: Pirimicarb at 0.14 kg on two occasions with fungicide. Haulm desiccant: Undiluted BOV at 170 l.

Seed: Pentland Crown.

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79/W/CS/239

Cultivations, etc.:- Heavy spring-tine cultivated: 6 Sept, 1978. Subsoiled with tines 140 cm apart and 70 cm deep: 12 Nov. Rotary cultivated: 19 Nov. Ploughed: 24 Nov. PK applied: 7 May, 1979. Heavy spring-tine cultivated: 8 May. Rotary cultivated, potatoes planted: 10 May. Weedkillers applied: 25 May. Rotary ridged: 19 June. Fungicide applied: 27 June, 10 July, 23 July, 10 Aug, 25 Aug, 6 Sept. Insecticide applied: 27 June, 10 July. Haulm desiccant applied: 25 Sept. Lifted: 11 Oct. Previous crops: Winter wheat 1977, winter oats 1978.

NOTE: Plots were assessed for dry matter of tubers and haulm and for numbers of tubers on several occasions during the season. Samples of tubers were analysed for nitrogen percentages.

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79/W/CS/239

TOTAL TUBERS TONNES/HECTARE

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

N RATE(1) / N FORM	200	300	MEAN
AQ U	51.9	40.9	46.4
AQ U+CS2	45.3	39.8	42.6
AQ U+NIT	43.4	43.4	43.4
NC E	43.1	43.0	43.0
NC E+L	42.9	¢44.0	43.5
IBDU	34.2	40.6	37.4
MEAN	43.5	41.9	42.7

EXTRA	NC E100	NC E400	NC EL100	NC EL400	MEAN
	33.5	38.0	36.6	48.9	39.2

GRAND MEAN 41.8

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

TABLE	N FORM	N RATE(1)	EXTRA	N FORM N RATE(1) & EXTRA
SED	3.77	2.17	5.32	5.32

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

STRATUM	DF	SE	CV%
BLOCK.WP	30	6.52	15.6

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

N RATE(1) / N FORM	200	300	MEAN
AQ U	91.2	85.8	88.5
AQ U+CS2	89.8	89.0	89.4
AQ U+NIT	87.6	89.6	88.6
NC E	89.2	89.9	89.5
NC E+L	90.9	87.5	89.2
IBDU	81.9	86.8	84.3
MEAN	88.4	88.1	88.3

EXTRA	NC E100	NC E400	NC EL100	NC EL400	MEAN
	79.1	85.5	83.5	89.8	84.5

GRAND MEAN 87.3

PLOT AREA HARVESTED 0.00260

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79/R/CS/240

EFFECTS OF MYCORRHIZA ON RESPONSE TO P

Object: To study the effects of two methods of inoculating mycorrhiza on the response of potatoes and leeks to a range of rates of phosphate fertiliser - Delharding.

Sponsors: D.P. Stribley, P.B. Tinker.

The first year early potatoes followed by leeks.

Design: Single replicate of 28 plots.

Whole plot dimensions: 2.84 x 3.35.

Treatments: All combinations of:-

1. MYCO INF — Methods of mycorrhizal infection:

NONE	None
CULTURE	Live culture of a yellow vacuolate mycorrhizal endophyte
INF SOIL	Soil from a site known to have mycorrhizal infection

2. P — Rates of phosphate fertiliser (kg P) as superphosphate:

0
20
40
60
80
100
120
140

Above treatments were applied to potatoes planted 30 cm (12 in.) apart in rows spaced 71 cm (28 in.) apart.

Four extra treatments were included, applied to potatoes planted 15 cm (6 in.) apart in rows 71 cm apart:

XTR CLOS

IOPO	No inoculum, no phosphate
IOP40	No inoculum, 40 kg P
ISOILPO	Mycorrhizal infected soil, no phosphate
ISOILP40	Mycorrhizal infected soil, 40 kg P

NOTES: (1) Inoculum for CULTURE was coarse sand containing 240 spores of Glomus mosseae per kg applied at 250 g per tuber. Inoculum for INF SOIL was soil containing 670 spores per kg of bulbous reticulate mycorrhiza (Gigaspora sp.) applied at 500 g per tuber.
(2) Leeks were not lifted by 31 Dec, 1979 and will be reported on in 'Yields' 1980.
(3) No yields were taken for XTR CLOS plots.

Basal applications: Manures: Chalk at 7.5 t. Muriate of potash at 580 kg. (25:0:16) at 720 kg. Kieserite at 340 kg.

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79/R/CS/240

Seed: Ulster Sceptre.

Cultivations, etc.:- Chalk applied: 4 Apr, 1979. K, NK and Mg applied: 23 Apr. Test P applied: 27 Apr. Spring-tine cultivated three times: 9 May, 10 May, 14 May. Rotary harrowed, rotary ridged: 14 May. Potatoes planted: 15 May. Lifted: 8 Aug. Previous crops: Winter wheat 1977, fallow 1978.

NOTE: Plots were sampled several times to assess mycorrhizal infection, P content of leaves and of soil.

TOTAL TUBERS TONNES/HECTARE

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

P	0	20	40	60	80	100	120	140	MEAN
MYCO INF									
NONE	5.2	10.2	14.9	12.9	14.5	12.7	18.5	13.8	12.8
CULTURE	5.4	8.6	12.5	13.5	16.5	14.5	13.1	11.5	12.0
INF SOIL	15.2	11.5	14.8	21.7	21.9	21.0	15.2	14.6	17.0
MEAN	8.6	10.1	14.1	16.0	17.6	16.1	15.6	13.3	13.9

PLOT AREA HARVESTED 0.00026

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79/R/CS/241

PESTICIDES AND SLOT-SEEDING

Object: To study the effects of aldicarb and phorate, applied at sowing, on the incidence of pests and on the survival and yield of ryegrass sown into an existing grass sward by a slot-seeding drill - Little Knott II.

Sponsors: I.F. Henderson, A.M. Spaull, R.W. Gibson.

The first year, grass.

Design: 3 randomised blocks of 7 plots split into 3.

Whole plot dimensions: 2.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1.	TREATMNT	Treatments, applied to old grass:
	0 0 0	None
	0 S 0	Slot seeder used not sowing seed
	G S R	Old grass killed with glyphosate, RvP ryegrass sown by slot-seeder
	0 S B	Baroldi ryegrass sown by slot-seeder
	0 S M	Grasslands Manawa ryegrass sown by slot-seeder
	0 S R	RvP ryegrass sown by slot-seeder
	0 S S	S.24 ryegrass sown by slot-seeder

Sub plots

2.	PESTCIDE	Pesticides applied at sowing:-
	NONE	None
	ALDICARB	Aldicarb at 10 kg
	PHORATE	Phorate at 10 kg

NOTES: (1) The slot-seeder cut slots in the sward 2.5 cm deep and 30 cm apart, using knife coulters. Seed was sown at 12 kg.
(2) Glyphosate to G S R was applied at 3.0 kg in 1000 l on 4 Apr, 1979.
(3) One replicate of each of the treatment combinations 0 S B ALDICARB, 0 S B NONE, 0 0 0 NONE, 0 0 0 ALDICARB, was sprayed with glyphosate in error. Estimated values were used in the analysis.

Basal applications: Manures: (20:14:14) at 125 kg combine drilled. (Applied by hand in rows 30 cm apart to 0 0 0). (25:0:16) at 200 kg after each cut except the last.

Cultivations, etc.:- Seed sown: 6 Apr, 1979. Cut: 30 May, 27 June, 25 July, 22 Aug, 18 Sept, 17 Oct. NK applied: 6 June, 28 June, 26 July, 24 Aug, 19 Sept.

NOTE: Samples of harvested produce were sorted and weighed to determine amounts of original sward, dicotyledonous weeds and sown species.

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79/R/CS/241

1ST CUT (30/5/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	3.08	3.10	3.44	3.21
0 S 0	2.84	2.39	2.74	2.65
G S R	0.32	0.24	0.44	0.33
0 S B	2.45	2.98	2.63	2.69
0 S M	2.65	2.95	2.73	2.78
0 S R	2.23	2.56	3.10	2.63
0 S S	2.56	2.54	2.50	2.53
MEAN	2.31	2.39	2.51	2.40

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.170	0.092	0.261
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.243

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.208	8.7
BLOCK.WP.SP	24	0.298	12.4

2ND CUT (27/6/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	1.35	1.33	1.23	1.30
0 S 0	1.69	1.41	1.76	1.62
G S R	1.63	1.90	2.08	1.87
0 S B	1.41	1.38	1.79	1.52
0 S M	1.38	1.50	1.45	1.44
0 S R	1.53	1.68	1.49	1.56
0 S S	1.54	1.52	1.69	1.58
MEAN	1.50	1.53	1.64	1.56

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.204	0.062	0.244
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.165

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.250	16.0
BLOCK.WP.SP	24	0.202	13.0

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79/R/CS/241

3RD CUT (25/7/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	1.09	0.76	0.86	0.90
0 S 0	0.81	0.82	0.92	0.85
G S R	1.20	1.43	1.36	1.33
0 S B	0.84	0.96	0.75	0.85
0 S M	0.57	0.72	0.75	0.68
0 S R	0.73	0.81	0.89	0.81
0 S S	0.59	0.91	0.87	0.79
MEAN	0.83	0.91	0.91	0.89

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.109	0.046	0.148
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.123

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.133	15.0
BLOCK.WP.SP	24	0.150	17.0

4TH CUT (22/8/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	1.14	1.10	1.13	1.13
0 S 0	0.90	1.16	1.26	1.11
G S R	1.35	1.50	1.53	1.46
0 S B	1.18	1.15	1.27	1.20
0 S M	1.05	1.20	1.12	1.12
0 S R	1.15	1.27	1.22	1.21
0 S S	0.84	1.17	1.33	1.11
MEAN	1.09	1.22	1.27	1.19

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.075	0.058	0.147
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.155

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.092	7.8
BLOCK.WP.SP	24	0.189	15.9

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79/R/CS/241

5TH CUT (18/9/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	0.79	0.56	0.68	0.68
0 S 0	0.72	0.80	0.69	0.74
G S R	0.68	0.69	0.76	0.71
0 S B	0.80	0.79	0.64	0.74
0 S M	0.60	0.68	0.69	0.66
0 S R	0.71	0.82	0.86	0.80
0 S S	0.49	0.70	0.72	0.64
MEAN	0.68	0.72	0.72	0.71

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.077	0.034	0.106
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.089

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.094	13.3
BLOCK.WP.SP	24	0.109	15.4

6TH CUT (17/10/79) DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	0.47	0.72	0.62	0.60
0 S 0	0.54	0.46	0.53	0.51
G S R	0.53	0.49	0.55	0.52
0 S B	0.40	0.41	0.56	0.46
0 S M	0.57	0.54	0.56	0.56
0 S R	0.44	0.53	0.57	0.52
0 S S	0.50	0.51	0.57	0.52
MEAN	0.49	0.52	0.57	0.53

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.041	0.029	0.074
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.076

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.050	9.6
BLOCK.WP.SP	24	0.093	17.6

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79/R/CS/241

TOTAL OF 6 CUTS DRY MATTER TONNES/HECTARE

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

PESTCIDE TREATMNT	NONE	ALDICARB	PHORATE	MEAN
0 0 0	7.93	7.57	7.96	7.82
0 S 0	7.50	7.03	7.89	7.48
G S R	5.71	6.24	6.72	6.23
0 S B	7.08	7.66	7.65	7.46
0 S M	6.82	7.58	7.30	7.23
0 S R	6.78	7.68	8.14	7.53
0 S S	6.51	7.35	7.66	7.18
MEAN	6.90	7.30	7.62	7.28

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

TABLE	TREATMNT	PESTCIDE	TREATMNT PESTCIDE
SED	0.222	0.143	0.381
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
TREATMNT			0.380

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.272	3.7
BLOCK.WP.SP	24	0.465	6.4

1ST CUT MEAN DM% 17.2
2ND CUT MEAN DM% 17.8
3RD CUT MEAN DM% 26.2
4TH CUT MEAN DM% 18.8
5TH CUT MEAN DM% 23.1
6TH CUT MEAN DM% 18.0
TOTAL OF 6 CUTS MEAN DM% 20.2

AVERAGE PLOT AREA HARVESTED 0.00071

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79/S/CS/1

FUNGICIDES, N AND GROWTH REGULATOR

Object: To study the effects of fungicides, and rates and times of applying nitrogen fertiliser and a growth regulator on the incidence of foliar diseases and on the yield of barley - Saxmundham, Oldershaw's and Garner's plots.

Sponsors: F.V. Widdowson, J.F. Jenkyn, A. Penny.

The 14th year, winter 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 73-78/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. Most treatments to wheat 1966-1976 and to barley 1977-1978 have been ignored.

Whole plot dimensions: 5.49 x 40.2.

Treatments: All combinations of:-

Whole plots

1. EYESFUNG — Fungicide to control eyespot: Carbendazim (as 'Bavistin' at 0.51 kg) in 220 l

   NONE — None
   SPRAYED — Sprayed 15 May, 1979

2. MILDFUNG — Fungicide to control mildew: Tridemorph at 0.53 kg in 220 l

   NONE — None
   SPRAYED — Sprayed 15 May

Half plots

3. APRIL N — Nitrogen fertiliser (kg N) applied on 2 May, 1979:

   0
   40

4. GRTH REG — Growth regulator: applied on 16 May

   NONE — None
   MEP+ETH — Mepiquat chloride + ethephon ('Terpal' at 2.46 kg) in 280 l

Quarter plots

5. E N RATE — Rates of early spring nitrogen fertiliser (kg N total):

   80
   120

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79/S/CS/1

6. E N TIME — Times of applying early spring nitrogen fertiliser:

FEB+MAR	Half on 6 Mar, half on 10 Apr
MAR	All on 10 Apr

XTRA EMR — Plus one additional whole plot per block sprayed with fungicides to control eyespot and mildew and given growth regulator, testing all combinations of:

Half plots

1. SEEDBD N — Nitrogen fertiliser (kg N) applied to seedbed on 26 Sept, 1978:

0
50

2. APRIL N — Nitrogen fertiliser (kg N) applied on 2 May, 1979

0
40

Quarter plots

3. E N RATE — Rates of early spring nitrogen fertiliser (kg N total):

80
120

4. E N TIME — Times of applying early spring nitrogen fertiliser:

FEB+MAR	Half on 6 Mar, half on 10 Apr
MAR	All on 10 Apr

NOTE: Plots not receiving test of seedbed N received 50 kg N after drilling.

Basal applications: (0:14:28) at 290 kg. Autumn weedkiller: Chlortoluron at 4.5 kg in 220 l. Spring weedkiller: 'Wheatclene', 2.5 kg of solid (metoxuron and simazine) 2.5 l of liquid (barban) in 220 l.

Seed: Sonja, sown at 160 kg.

Cultivations, etc.:- PK applied: 19 Sept, 1978. Seed sown, chlortoluron applied: 26 Sept. Spring weedkillers applied: 10 Apr, 1979. Combine harvested: 8 Aug.

NOTES: (1) Soils were sampled and assessed for mineral N in March and April, leaf diseases were assessed in May and June and N content of grain was assessed at harvest.
(2) Because of a design error, in the main analysis many interactions are identified with each other and therefore only the main effects are presented.
(3) Because of bird damage the yields from two XTRA EMR sub plots were lost, the treatment combinations are marked with * in the table.

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79/S/CS/1

GRAIN TONNES/HECTARE

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

EYESFUNG	NONE	SPRAYED	MEAN
	6.40	6.70	6.55

MILDFUNG	NONE	SPRAYED	MEAN
	6.53	6.57	6.55

APRIL N	0	40	MEAN
	6.29	6.81	6.55

GRTH REG	NONE	MEP+ETH	MEAN
	6.45	6.65	6.55

E N RATE	80	120	MEAN
	6.28	6.82	6.55

E N TIME	FEB+MAR	MAR	MEAN
	6.64	6.46	6.55

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

TABLE	EYESFUNG	MILDFUNG	APRIL N	GRTH REG
SED	0.123	0.123	0.199	0.199

TABLE	E N RATE	E N TIME
SED	0.071	0.071

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.247	3.8
BLOCK.WP.HP	5	0.563	8.6
BLOCK.WP.HP.QP	12	0.282	4.3

GRAIN MEAN DM % 84.1

XTRA EMR

GRAIN TONNES/HECTARE

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

SEEDBD N	APRIL N	E N TIME / E N RATE	FEB+MAR	MAR
0	0	80	2.76	*
		120	6.59	3.78
	40	80	6.07	5.96
		120	6.72	6.80
50	0	80	5.11	5.75
		120	6.73	6.93
	40	80	*	5.03
		120	5.34	6.69

GRAIN MEAN DM % 84.2 SUB PLOT AREA HARVESTED 0.00466

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79/R/WW/1 and 79/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 on them on land in rotation (pathogen free) and after cereal (pathogen infected) - Rothamsted Fosters Corner (pathogen free RH) and Pastures (pathogen infected RD), Woburn Horsepool Lane Close East (pathogen free WH).

Sponsors: R. Moffitt, R.J. Gutteridge.

Design: 3 randomised blocks of 8 plots split into 4 (except Woburn 4 blocks).

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties:

ARMADA	Armada
COPAIN	Copain
FLANDERS	Flanders
HUSTLER	Hustler
MARDLER	Mardler
HUNTSMAN	Maris Huntsman
SENTRY	Sentry
SPORTSMN	Sportsman

Sub plots

2. N — Nitrogen fertiliser (kg N):

(RH)	(RD&WH)	Fosters Corner (RH)	Pastures (RD) & Horsepool Lane Close East (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

NOTE: Spring N was applied as 'Nitro-Chalk'. N at flowering was applied as aqueous urea (6% N) in two equal applications at 31.5 kg on 19 June, 12 July to Fosters Corner (RH) and Pastures (RD) and as 'Nitro-Chalk' in one application on 25 June, to Horsepool Lane Close East (WH).

Basal applications: Manures: Fosters Corner (RH), Pastures (RD) and Horsepool Lane Close East (WH): (0:20:20) at 310 kg (RH) and (RD) combine drilled, (WH) broadcast. Weedkillers: Fosters Corner (RH): Bromoxynil and ioxynil (as 'Oxytril CM' at 2.1 kg in 220 l). Pastures (RD): Mecoprop at 2.5 kg in 220 l. Horsepool Lane Close East (WH): Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg in 250 l).

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79/R/WW/1 and 79/W/WW/1

Seed: Fosters Corner (RH) and Pastures (RD): Varieties sown at 190 kg.
Horsepool Lane Close East (WH): Varieties sown at 180 kg.

Cultivations, etc.:-
Fosters Corner (RH): Heavy spring-tine cultivated twice, seed sown: 23 Oct, 1978. N applied: 3 May, 1979. Weedkillers applied: 14 May. Combine harvested: 31 Aug. Previous cropping: Beans 1977, potatoes 1978.
Pastures (RD): Ploughed: 17 Oct, 1978. Rotary harrowed, seed sown: 23 Oct. N and weedkiller applied: 8 May, 1979. Combine harvested: 31 Aug. Previous cropping: Beans 1977, wheat 1978.
Horsepool Lane Close East (WH): Heavy spring-tine cultivated twice: 11 Oct, 1978, 13 Oct. PK applied, spring-tine cultivated with crumbler attached: 17 Oct. Seed sown: 20 Oct. N applied: 26 Apr, 1979. Weedkillers applied: 15 May. Combine harvested: 31 Aug. Previous crops: Winter oats 1977, potatoes 1978.

NOTE: Samples were taken in July on Pastures (RD) for estimates of eyespot (Pseudocercosporella herpotrichoides) and take-all (Gaeumannomyces graminis).

79/R/WW/1 FOSTERS CORNER (RH) PATHOGEN FREE

GRAIN TONNES/HECTARE

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

N	0	63	126	63+63	MEAN
VARIETY					
ARMADA	4.14	6.49	6.82	6.65	6.03
COPAIN	3.32	6.12	7.08	6.35	5.72
FLANDERS	3.91	6.42	6.84	6.64	5.96
HUSTLER	3.68	6.48	6.39	6.68	5.81
MARDLER	4.04	6.27	6.05	6.30	5.67
HUNTSMAN	3.82	6.53	7.09	6.61	6.01
SENTRY	3.72	6.09	5.95	5.94	5.42
SPORTSMN	4.44	5.63	6.07	6.50	5.66
MEAN	3.88	6.25	6.54	6.46	5.78

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

TABLE	VARIETY	N	VARIETY N
SED	0.143	0.103	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.292

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.175	3.0
BLOCK.WP.SP	48	0.358	6.2

GRAIN MEAN DM% 83.9

SUB PLOT AREA HARVESTED 0.00173

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79/R/WW/1 PASTURES (RD) PATHOGEN INFECTED

GRAIN TONNES/HECTARE

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

N VARIETY	63	126	189	126+63	MEAN
ARMADA	5.13	6.03	5.06	5.31	5.38
COPAIN	4.95	6.30	6.63	6.26	6.03
FLANDERS	5.22	5.80	6.00	5.91	5.73
HUSTLER	5.34	6.22	5.49	5.87	5.73
MARDLER	5.32	5.87	5.37	5.34	5.48
HUNTSMAN	5.66	6.47	6.56	6.43	6.28
SENTRY	5.15	5.78	5.99	5.72	5.66
SPORTSMN	5.65	5.76	5.19	5.40	5.50
MEAN	5.30	6.03	5.79	5.78	5.72

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

TABLE	VARIETY	N	VARIETY N
SED	0.191	0.112	0.334
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.316

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.234	4.1
BLOCK.WP.SP	48	0.387	6.8

GRAIN MEAN DM% 85.5

SUB PLOT AREA HARVESTED 0.00172

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79/W/WW/1 HORSEPOOL LANE CLOSE EAST (WH) PATHOGEN FREE

GRAIN TONNES/HECTARE

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

N	63	126	189	126+63	MEAN
VARIETY					
ARMADA	4.93	4.78	4.45	4.82	4.75
COPAIN	4.17	4.56	4.21	4.13	4.27
FLANDERS	4.75	4.53	4.10	4.39	4.44
HUSTLER	4.57	4.25	3.76	4.02	4.15
MARDLER	4.36	4.27	3.36	3.37	3.84
HUNTSMAN	4.63	4.51	4.15	4.08	4.34
SENTRY	4.14	4.08	3.19	3.60	3.75
SPORTSMN	3.64	3.05	2.64	3.03	3.09
MEAN	4.40	4.25	3.73	3.93	4.08

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

TABLE	VARIETY	N	VARIETY N
SED	0.168	0.095	0.286
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.267

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.206	5.1
BLOCK.WP.SP	48	0.328	8.0

GRAIN MEAN DM% 82.8

SUB PLOT AREA HARVESTED 0.00173

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79/R/WW/2 and 79/W/WW/2

WINTER WHEAT

AQUEOUS N AND NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to aqueous urea on the yield and nitrogen uptake of winter wheat. At Rothamsted only, the effects of conventional and direct drilling are also studied - Rothamsted (R) Pastures and Woburn (W) Warren Field I.

Sponsors: F.V. Widdowson, J. Ashworth, A. Penny.

Design: 2 randomised blocks each containing 4 sub-blocks of 3 plots, plus 6 extra plots. At Rothamsted another factor (drilling) was applied to half-blocks in a criss-cross manner.

Whole plot dimensions: Pastures (R): 4.27 x 29.0.
Warren Field I (W): 4.27 x 12.2.

Treatments: All combinations of:-

Sub-blocks (SB)

1. AQ N AUT	Rates of nitrogen (kg N) injected in autumn as aqueous urea:
50	
100	
2. TOTAL N	Total rates of nitrogen (kg N), part applied in autumn (AQ N AUT), part in spring as 'Nitro-Chalk':
150	Total 150 (100 in spring to AQ N AUT 50, 50 in spring to AQ N AUT 100)
200	Total 200 (150 in spring to AQ N AUT 50, 100 in spring to AQ N AUT 100)

Plots (WP)

3. N INHIB	Nitrification inhibitors added to aqueous urea:
NITRAPYR	Nitrapyrin at 1.5 kg
PEX 2	Potassium ethyl xanthate at 2 kg
PEX 10	Potassium ethyl xanthate at 10 kg

plus six extra plots given 'Nitro-Chalk' only in spring (kg N):

EXTRA

0
NC 50
NC 100
NC 150
NC 200
NC 250

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79/R/WW/2 and 79/W/WW/2

Half-blocks (HB) (R only)

4. DRILLING Drilling method:

CNVNTIAL	Conventional
DIRECT	Direct drilled

NOTE: 'Nitro-Chalk' dressings were divided, two-thirds in April, one-third in May.

Basal applications:
Pastures (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Paraquat at 0.42 kg ion in 220 l. Mecoprop at 2.5 kg in 220 l. Growth regulator: Chlormequat at 1.7 kg in 220 l.
Warren Field I (W): Manures: (0:20:20) at 310 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 kg in 250 l). Growth regulator: Chlormequat at 1.7 kg in 250 l.

Seed: Pastures (R): Flanders, sown at 190 kg.
Warren Field I (W): Maris Kinsman, sown at 190 kg.

Cultivations, etc.:-
Pastures (R): 'CNVNTIAL': Chisel ploughed twice: 6 Oct, 1978. Aqueous N with inhibitors injected: 9 Oct. All plots disc harrowed, seed sown, 'CNVNTIAL' plots harrowed in, 'DIRECT' plots disced in: 12 Oct. Paraquat applied: 23 Oct. 'Nitro-Chalk' applied: 20 Apr, 1979. Mecoprop applied: 9 May. 'Nitro-Chalk' applied: 17 May. Growth regulator applied: 1 June. Combine harvested: 29 Aug. Previous cropping: Beans 1977, wheat 1978.
Warren Field I (W): Heavy spring-tine cultivated: 11 Sept, 1978. Deep-tine cultivated: 18 Sept. Aqueous N with inhibitors injected: 10 Oct. PK applied: 17 Oct. Disc harrowed twice: 13-14 Nov. Seed sown: 14 Nov. 'Nitro-Chalk' applied: 23 Apr, 1979. Weedkiller applied: 15 May. 'Nitro-Chalk' applied: 18 May. Growth regulator applied: 1 June. Combine harvested: 31 Aug. Previous cropping: Potatoes 1977, wheat 1978.

NOTE: At Rothamsted only soil samples were taken at monthly intervals, November to July for measurements of nitrate and ammonia.

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79/R/WW/2 PASTURES(R)

GRAIN TONNES/HECTARE

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

N INHIB AQ N AUT	NITRAPYR	PEX 2	PEX 10	MEAN
50	5.70	5.17	5.55	5.47
100	6.01	5.61	5.42	5.68
MEAN	5.85	5.39	5.48	5.58

TOTAL N AQ N AUT	150	200	MEAN
50	5.38	5.56	5.47
100	5.20	6.17	5.68
MEAN	5.29	5.86	5.58

TOTAL N N INHIB	150	200	MEAN
NITRAPYR	5.68	6.02	5.85
PEX 2	5.09	5.69	5.39
PEX 10	5.09	5.88	5.48
MEAN	5.29	5.86	5.58

DRILLING AQ N AUT	CNVNTIAL	DIRECT	MEAN
50	5.53	5.42	5.47
100	5.69	5.68	5.68
MEAN	5.61	5.55	5.58

DRILLING N INHIB	CNVNTIAL	DIRECT	MEAN
NITRAPYR	5.91	5.80	5.85
PEX 2	5.38	5.41	5.39
PEX 10	5.53	5.44	5.48
MEAN	5.61	5.55	5.58

DRILLING TOTAL N	CNVNTIAL	DIRECT	MEAN
150	5.32	5.26	5.29
200	5.89	5.84	5.86
MEAN	5.61	5.55	5.58

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79/R/WW/2 PASTURES(R)

GRAIN TONNES/HECTARE

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

N INHIB	NITRAPYR		PEX 2		PEX 10	
TOTAL N	150	200	150	200	150	200
AQ N AUT						
50	5.61	5.78	5.01	5.33	5.51	5.58
100	5.75	6.27	5.17	6.05	4.67	6.18

N INHIB	NITRAPYR		PEX 2		PEX 10	
DRILLING	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
AQ N AUT						
50	5.78	5.61	5.13	5.22	5.67	5.42
100	6.03	5.99	5.63	5.60	5.40	5.45

TOTAL N	150		200	
DRILLING	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
AQ N AUT				
50	5.48	5.28	5.58	5.55
100	5.16	5.23	6.21	6.12

TOTAL N	150		200	
DRILLING	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N INHIB				
NITRAPYR	5.76	5.61	6.06	5.99
PEX 2	5.08	5.11	5.69	5.70
PEX 10	5.13	5.05	5.94	5.82

TOTAL N		150		200	
	DRILLING	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
AQ N AUT	N INHIB				
50	NITRAPYR	5.65	5.58	5.91	5.64
	PEX 2	4.98	5.05	5.28	5.38
	PEX 10	5.81	5.22	5.53	5.63
100	NITRAPYR	5.87	5.64	6.20	6.34
	PEX 2	5.17	5.18	6.09	6.01
	PEX 10	4.44	4.89	6.35	6.00

DRILLING	CNVNTIAL	DIRECT	MEAN
EXTRA			
0	1.84	1.60	1.72
NC 50	3.03	3.60	3.31
NC 100	4.50	4.17	4.33
NC 150	5.81	5.85	5.83
NC 200	6.22	5.19	5.71
NC 250	5.78	6.38	6.08
MEAN	4.53	4.47	4.50

GRAND MEAN 5.22

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79/R/WW/2 PASTURES(R)

GRAIN TONNES/HECTARE

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

TABLE	AQ N AUT	N INHIB	TOTAL N	EXTRA
SED	0.288	0.153	0.288	0.706

TABLE	AQ N AUT N INHIB	AQ N AUT TOTAL N	N INHIB TOTAL N	AQ N AUT* DRILLING
SED	0.338	0.408	0.338	0.330
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
AQ N AUT	0.217			0.358
TOTAL N			0.217	

TABLE	N INHIB* DRILLING	TOTAL N* DRILLING	AQ N AUT N INHIB TOTAL N	AQ N AUT* N INHIB DRILLING
SED	0.217	0.330	0.478	0.414
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
N INHIB	0.379			
AQ N AUT				0.437
TOTAL N		0.358		
AQ N AUT.TOTAL N			0.307	
AQ N AUT.DRILLING				0.307

TABLE	AQ N AUT* TOTAL N DRILLING	N INHIB* TOTAL N DRILLING	AQ N AUT* N INHIB TOTAL N DRILLING	DRILLING* EXTRA
SED	0.467	0.414	0.586	0.809
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
TOTAL N		0.437		
AQ N AUT.TOTAL N	0.424		0.553	
TOTAL N.DRILLING		0.307		
AQ N AUT.TOTAL N.DRILLING			0.434	
EXTRA				0.622

* WITHIN THE SAME LEVEL OF DRILLING ONLY

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

STRATUM	DF	SE	CV%
BLOCK.SB	9	0.576	11.0
BLOCK.SB.HB	9	0.322	6.2
BLOCK.SB.HB.WP	16	0.434	8.3

GRAIN MEAN DM% 84.6

SUB PLOT AREA HARVESTED 0.00290

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79/W/WW/2 WARREN FIELD (W)

GRAIN TONNES/HECTARE

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

N INHIB AQ N AUT	NITRAPYR	PEX 2	PEX 10	MEAN
50	4.72	4.99	5.10	4.94
100	4.77	4.33	4.48	4.53
MEAN	4.74	4.66	4.79	4.73

TOTAL N AQ N AUT	150	200	MEAN
50	5.20	4.68	4.94
100	4.16	4.89	4.53
MEAN	4.68	4.79	4.73

TOTAL N N INHIB	150	200	MEAN
NITRAPYR	5.09	4.39	4.74
PEX 2	4.42	4.91	4.66
PEX 10	4.53	5.05	4.79
MEAN	4.68	4.79	4.73

AQ N AUT	TOTAL N N INHIB	150	200
50	NITRAPYR	5.19	4.25
	PEX 2	5.13	4.86
	PEX 10	5.27	4.93
100	NITRAPYR	4.99	4.54
	PEX 2	3.70	4.97
	PEX 10	3.80	5.16

EXTRA	0	NC 50	NC 100	NC 150	NC 200	NC 250	MEAN
	1.79	4.31	5.28	5.15	4.48	3.59	4.10

GRAND MEAN 4.52

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

TABLE	EXTRA	AQ N AUT	N INHIB	TOTAL N
SED	0.330	0.135	0.062	0.135

TABLE	AQ N AUT N INHIB	AQ N AUT TOTAL N	N INHIB TOTAL N	AQ N AUT N INHIB TOTAL N
SED	0.153	0.190	0.153	0.216
EXCEPT WHEN COMPARING MEANS WITH SAME LEVELS(S) OF:				
AQ N AUT	0.088			
TOTAL N			0.088	
AQ N AUT.TOTAL N				0.124

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

STRATUM	DF	SE	CV%
BLOCK.SB	9	0.190	4.2
BLOCK.SB.WP	8	0.124	2.7

GRAIN MEAN DM% 86.6 SUB PLOT AREA HARVESTED 0.0279

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79/R/WW/3

WINTER WHEAT

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of wheat - West Barnfield I.

Sponsors: C.F. Banfield, A. Dewar, J. Lacey, A. Penny, R.T. Plumb, R.D. Prew, G.N. Thorne, T.D. Williams.

Associate sponsors: P.J. Welbank, F.V. Widdowson.

Design: Half replicate of 2^8 + 6 extra plots.

Whole plot dimensions: 3.25 x 15.2.

Treatments: Combinations of:-

1. DRILL — Drills, sowing seed at 380 seeds per m^2 in rows 10 cm (4 in) apart:
   - NORDSTEN — Nordsten drill spacing seed irregularly within the row
   - STANHAY — Stanhay precision drill
2. SOWDATE — Dates of sowing:
   - 21 SEPT — 21 September, 1978
   - 13 OCT — 13 October
3. TOTAL N — Total amount of nitrogen fertiliser (kg N) applied:
   - 160
   - 250
4. N TIME — Times of applying nitrogen fertiliser:
   - A — All applied on 6 April
   - M A M — 40 kg of the total applied on 12 March, 30 kg applied on 17 May, remainder on 6 April
5. AUT PEST — Autumn pesticide:
   - NONE — None
   - ALDICARB — Aldicarb at 5 kg worked in to seedbed
6. APHICIDE — Aphicide:
   - NONE — None
   - PIRIMICA — Pirimicarb at 0.14 kg in 340 l applied twice: 26 June and 17 July
7. FUNGCIDE — Fungicide:
   - NONE — None
   - CA+MA+TR — Carbendazim + maneb + tridemorph (as 'Cosmic' at 4.0 kg) in 340 l applied twice: 30 May and 26 June

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8. IRRIGATN Irrigation:

NONE	None
FULL	Full (125 mm) to lessen a deficit of 25 mm to 12.5 mm

plus six extra plots, all sown by Stanhay drill on 21 Sept, all N applied on 6 Apr, given aldicarb, pirimicarb, carbendazim + maneb + tridemorph and full irrigation, testing rates of nitrogen fertiliser (kg N):

EXTRA

N 0
N 100
N 130
N 190
N 220
N 280

NOTE: Irrigation treatments were as follows:-

	mm water
5 July	25
10/12 July	50
19 July	25
25 July	25

Basal applications: Manures: (0:14:28) at 360 kg. Weedkillers: Methabenzthiazuron at 1.6 kg in 340 l. Growth regulator: Chlormequat at 1.4 kg in 340 l.

Seed: Maris Hustler, sown at 174 kg.

Cultivations, etc.:- Harrowed: 13 Sept, 1978. PK applied: 14 Sept. Heavy spring-tine cultivated twice: 15 Sept. Power harrowed all early-sown treatments, and those for STANHAY rolled: 20 Sept. Seed sown on all early-sown plots: 21 Sept. Power harrowed all late-sown plots: 12 Oct. Late-sown STANHAY plots rolled, seed sown on all late-sown plots: 13 Oct. Weedkillers applied: 19 Oct. Growth regulator applied to early-sown plots: 18 Apr, 1979. Growth regulator applied to late-sown plots: 8 May. Combine harvested: 31 Aug. Previous cropping: Fallow, oats, barley, wheat 1977, potatoes 1978.

NOTES: (1) The growth regulator was applied to both the early and late sown crops at Zadoks Growth Stage 3.0.
(2) Soil was sampled for nematodes, mineral N and moisture content. Roots were sampled for foot and root rots. The above ground crop was examined for growth stage, aphids, foliar diseases (including BYDV) and general microflora. Plant populations, shoot numbers and sowing depth were measured. Dry weight, leaf area, and N and K content of the above-ground crop and stem nitrate were measured on several occasions.

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GRAIN DRY MATTER TONNES/HECTARE

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

SOWDATE DRILLS	21 SEPT	13 OCT	MEAN
NORDSTEN	9.64	9.58	9.61
STANHAY	9.81	9.56	9.68
MEAN	9.72	9.57	9.65

TOTAL N DRILLS	160	250	MEAN
NORDSTEN	9.90	9.32	9.61
STANHAY	9.93	9.43	9.68
MEAN	9.91	9.38	9.65

TOTAL N SOWDATE	160	250	MEAN
21 SEPT	10.05	9.39	9.72
13 OCT	9.77	9.36	9.57
MEAN	9.91	9.38	9.65

N TIME DRILLS	A	M A M	MEAN
NORDSTEN	9.46	9.76	9.61
STANHAY	9.54	9.83	9.68
MEAN	9.50	9.79	9.65

N TIME SOWDATE	A	M A M	MEAN
21 SEPT	9.47	9.98	9.72
13 OCT	9.53	9.61	9.57
MEAN	9.50	9.79	9.65

N TIME TOTAL N	A	M A M	MEAN
160	9.81	10.02	9.91
250	9.19	9.57	9.38
MEAN	9.50	9.79	9.65

AUT PEST DRILLS	NONE	ALDICARB	MEAN
NORDSTEN	9.47	9.75	9.61
STANHAY	9.57	9.80	9.68
MEAN	9.52	9.77	9.65

AUT PEST SOWDATE	NONE	ALDICARB	MEAN
21 SEPT	9.55	9.90	9.72
13 OCT	9.49	9.65	9.57
MEAN	9.52	9.77	9.65

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GRAIN DRY MATTER TONNES/HECTARE

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

AUT PEST TOTAL N	NONE	ALDICARB	MEAN
160	9.78	10.05	9.91
250	9.26	9.49	9.38
MEAN	9.52	9.77	9.65

AUT PEST N TIME	NONE	ALDICARB	MEAN
A	9.35	9.65	9.50
M A M	9.69	9.90	9.79
MEAN	9.52	9.77	9.65

APHICIDE DRILLS	NONE	PIRIMICA	MEAN
NORDSTEN	9.00	10.22	9.61
STANHAY	8.97	10.39	9.68
MEAN	8.99	10.30	9.65

APHICIDE SOWDATE	NONE	PIRIMICA	MEAN
21 SEPT	9.03	10.41	9.72
13 OCT	8.94	10.19	9.57
MEAN	8.99	10.30	9.65

APHICIDE TOTAL N	NONE	PIRIMICA	MEAN
160	9.42	10.41	9.91
250	8.56	10.19	9.38
MEAN	8.99	10.30	9.65

APHICIDE N TIME	NONE	PIRIMICA	MEAN
A	8.68	10.31	9.50
M A M	9.29	10.30	9.79
MEAN	8.99	10.30	9.65

APHICIDE AUT PEST	NONE	PIRIMICA	MEAN
NONE	8.77	10.27	9.52
ALDICARB	9.21	10.34	9.77
MEAN	8.99	10.30	9.65

FUNGCIDE DRILLS	NONE	CA+MA+TR	MEAN
NORDSTEN	9.12	10.10	9.61
STANHAY	9.20	10.16	9.68
MEAN	9.16	10.13	9.65

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GRAIN DRY MATTER TONNES/HECTARE

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

FUNGCIDE SOWDATE	NONE	CA+MA+TR	MEAN
21 SEPT	9.16	10.29	9.72
13 OCT	9.15	9.98	9.57
MEAN	9.16	10.13	9.65

FUNGCIDE TOTAL N	NONE	CA+MA+TR	MEAN
160	9.52	10.31	9.91
250	8.80	9.95	9.38
MEAN	9.16	10.13	9.65

FUNGCIDE N TIME	NONE	CA+MA+TR	MEAN
A	9.01	9.98	9.50
M A M	9.30	10.28	9.79
MEAN	9.16	10.13	9.65

FUNGCIDE AUT PEST	NONE	CA+MA+TR	MEAN
NONE	9.01	10.03	9.52
ALDICARB	9.31	10.24	9.77
MEAN	9.16	10.13	9.65

FUNGCIDE APHICIDE	NONE	CA+MA+TR	MEAN
NONE	8.61	9.37	8.99
PIRIMICA	9.71	10.90	10.30
MEAN	9.16	10.13	9.65

IRRIGATN DRILLS	NONE	FULL	MEAN
NORDSTEN	9.69	9.53	9.61
STANHAY	9.83	9.53	9.68
MEAN	9.76	9.53	9.65

IRRIGATN SOWDATE	NONE	FULL	MEAN
21 SEPT	9.84	9.61	9.72
13 OCT	9.68	9.45	9.57
MEAN	9.76	9.53	9.65

IRRIGATN TOTAL N	NONE	FULL	MEAN
160	9.99	9.84	9.91
250	9.54	9.22	9.38
MEAN	9.76	9.53	9.65

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GRAIN DRY MATTER TONNES/HECTARE

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

IRRIGATN	NONE	FULL	MEAN
N TIME			
A	9.66	9.34	9.50
M A M	9.87	9.72	9.79
MEAN	9.76	9.53	9.65

IRRIGATN	NONE	FULL	MEAN
AUT PEST			
NONE	9.56	9.48	9.52
ALDICARB	9.97	9.58	9.77
MEAN	9.76	9.53	9.65

IRRIGATN	NONE	FULL	MEAN
APHICIDE			
NONE	9.14	8.84	8.99
PIRIMICA	10.38	10.22	10.30
MEAN	9.76	9.53	9.65

IRRIGATN	NONE	FULL	MEAN
FUNGCIDE			
NONE	9.35	8.97	9.16
CA+MA+TR	10.17	10.09	10.13
MEAN	9.76	9.53	9.65

SOWDATE	21 SEPT		13 OCT	
TOTAL N	160	250	160	250
DRILLS				
NORDSTEN	10.01	9.28	9.79	9.37
STANHAY	10.10	9.51	9.76	9.35

SOWDATE	21 SEPT		13 OCT	
N TIME	A	M A M	A	M A M
DRILLS				
NORDSTEN	9.28	10.00	9.64	9.52
STANHAY	9.65	9.96	9.42	9.70

TOTAL N	160		250	
N TIME	A	M A M	A	M A M
DRILLS				
NORDSTEN	9.78	10.01	9.13	9.51
STANHAY	9.83	10.03	9.24	9.62

TOTAL N	160		250	
N TIME	A	M A M	A	M A M
SOWDATE				
21 SEPT	9.93	10.18	9.00	9.78
13 OCT	9.68	9.87	9.37	9.35

SOWDATE	21 SEPT		13 OCT	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.48	9.80	9.46	9.69
STANHAY	9.62	9.99	9.51	9.60

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GRAIN RY MATTER TONNES/HECTARE

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

TOTAL N	160		250	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.72	10.08	9.22	9.42
STANHAY	9.83	10.03	9.30	9.56

TOTAL N	160		250	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
21 SEPT	9.86	10.25	9.24	9.55
13 OCT	9.69	9.86	9.28	9.44

AUT PEST	NONE	ALDICARB	NONE	ALDICARB
DRILLS				
NORDSTEN	9.29	9.62	9.65	9.87
STANHAY	9.40	9.67	9.73	9.92

N TIME	A		M A M	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
21 SEPT	9.19	9.74	9.90	10.06
13 OCT	9.50	9.56	9.48	9.74

N TIME	A		M A M	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
TOTAL N				
160	9.65	9.97	9.90	10.14
250	9.04	9.33	9.48	9.65

SOWDATE	21 SEPT		13 OCT	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	9.00	10.29	9.01	10.14
STANHAY	9.07	10.54	8.88	10.24

TOTAL N	160		250	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	9.35	10.44	8.65	9.99
STANHAY	9.48	10.39	8.47	10.39

TOTAL N	160		250	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
21 SEPT	9.50	10.60	8.56	10.22
13 OCT	9.33	10.22	8.56	10.16

N TIME	A		M A M	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	8.73	10.19	9.28	10.24
STANHAY	8.64	10.43	9.30	10.35

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GRAIN DRY MATTER TONNES/HECTARE

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

N TIME	A		M A M	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
21 SEPT	8.57	10.36	9.50	10.47
13 OCT	8.80	10.26	9.09	10.13

N TIME	A		M A M	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
TOTAL N				
160	9.27	10.34	9.56	10.48
250	8.10	10.28	9.03	10.11

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
DRILLS				
NORDSTEN	8.84	10.10	9.17	10.33
STANHAY	8.70	10.43	9.24	10.35

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
21 SEPT	8.77	10.33	9.29	10.50
13 OCT	8.77	10.21	9.12	10.17

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
TOTAL N				
160	9.20	10.35	9.63	10.47
250	8.34	10.18	8.78	10.20

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
N TIME				
A	8.46	10.23	8.91	10.39
M A M	9.08	10.30	9.51	10.29

SOWDATE	21 SEPT		13 OCT	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
DRILLS				
NORDSTEN	9.10	10.19	9.14	10.02
STANHAY	9.23	10.39	9.17	9.94

TOTAL N	160		250	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
DRILLS				
NORDSTEN	9.49	10.30	8.74	9.90
STANHAY	9.54	10.32	8.86	10.01

TOTAL N	160		250	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
21 SEPT	9.56	10.55	8.76	10.03
13 OCT	9.47	10.08	8.84	9.88

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GRAIN DRY MATTER TONNES/HECTARE

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

N TIME	A		M A M	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
DRILLS				
NORDSTEN	8.95	9.97	9.28	10.24
STANHAY	9.07	10.00	9.33	10.33

N TIME	A		M A M	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
21 SEPT	8.93	10.01	9.39	10.57
13 OCT	9.09	9.96	9.21	10.00

N TIME	A		M A M	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
160	9.45	10.17	9.58	10.46
250	8.57	9.80	9.03	10.11

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
DRILLS				
NORDSTEN	8.94	10.00	9.29	10.21
STANHAY	9.07	10.06	9.33	10.26

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
21 SEPT	8.93	10.17	9.40	10.40
13 OCT	9.09	9.89	9.22	10.07

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
160	9.34	10.21	9.69	10.42
250	8.67	9.85	8.93	10.05

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N TIME				
A	8.80	9.89	9.22	10.08
M A M	9.21	10.17	9.40	10.39

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
DRILLS				
NORDSTEN	8.58	9.43	9.65	10.78
STANHAY	8.63	9.32	9.77	11.01

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
21 SEPT	8.59	9.48	9.73	11.10
13 OCT	8.62	9.27	9.69	10.70

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79/R/WW/3

GRAIN DRY MATTER TONNES/HECTARE

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

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
160	9.08	9.75	9.95	10.88
250	8.13	9.00	9.47	10.91

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N TIME				
A	8.24	9.13	9.78	10.84
M A M	8.97	9.62	9.64	10.95

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
AUT PEST				
NONE	8.32	9.22	9.69	10.84
ALDICARB	8.89	9.52	9.73	10.95

SOWDATE	21 SEPT		13 OCT	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.76	9.53	9.62	9.53
STANHAY	9.92	9.69	9.75	9.37

TOTAL N	160		250	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.98	9.82	9.40	9.24
STANHAY	10.00	9.86	9.67	9.19

TOTAL N	160		250	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	10.13	9.98	9.55	9.24
13 OCT	9.84	9.70	9.52	9.20

N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.57	9.34	9.80	9.72
STANHAY	9.74	9.33	9.93	9.73

N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.64	9.30	10.04	9.92
13 OCT	9.67	9.38	9.69	9.52

N TIME	A		M A M	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.87	9.75	10.11	9.93
250	9.44	8.93	9.63	9.51

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GRAIN DRY MATTER TONNES/HECTARE

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

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.46	9.48	9.91	9.58
STANHAY	9.65	9.48	10.02	9.58

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.62	9.48	10.06	9.73
13 OCT	9.50	9.48	9.87	9.43

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.84	9.72	10.14	9.97
250	9.28	9.24	9.79	9.19

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	9.42	9.27	9.89	9.41
M A M	9.69	9.69	10.04	9.75

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.10	8.91	10.28	10.15
STANHAY	9.18	8.77	10.49	10.29

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.16	8.90	10.52	10.31
13 OCT	9.11	8.78	10.25	10.13

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.46	9.37	10.51	10.31
250	8.81	8.31	10.26	10.13

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	8.93	8.44	10.38	10.24
M A M	9.35	9.24	10.39	10.20

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	8.87	8.67	10.25	10.29
ALDICARB	9.41	9.01	10.52	10.15

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GRAIN DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
DRILLS				
NORDSTEN	9.33	8.90	10.05	10.16
STANHAY	9.37	9.03	10.30	10.03

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
21 SEPT	9.38	8.94	10.30	10.27
13 OCT	9.32	8.99	10.05	9.91

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
160	9.62	9.41	10.36	10.27
250	9.08	8.52	9.99	9.92

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
A	9.31	8.71	10.00	9.97
M A M	9.38	9.23	10.35	10.22

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	9.13	8.89	9.99	10.07
ALDICARB	9.57	9.04	10.36	10.12

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
APHICIDE				
NONE	8.91	8.30	9.36	9.38
PIRIMICA	9.78	9.63	10.99	10.81

EXTRA	N 0	N 100	N 130	N 190	N 220	N 280	MEAN
	8.01	10.27	11.90	10.79	11.06	10.64	10.45

GRAND MEAN 9.68

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

SED FOR ALL TABLES EXCEPT EXTRA

ONE FACTOR TABLE	0.096
TWO FACTOR TABLES	0.135
THREE FACTOR TABLES	0.191

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

STRATUM	DF	SE	CV%
WP	35	0.541	5.6

GRAIN MEAN DM% 85.1 PLOT AREA HARVESTED 0.00204

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79/W/WW/3

WINTER WHEAT

GROWTH AND YIELD ON A CONTRASTED SITE

Object: To study on a contrasted site the effects of some of the factors tested in 79/R/WW/3 Factors Limiting Yield and to determine the extent to which differences between the sites can be eliminated by appropriate combinations of the factors - Woburn Butt Close III.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: Half replicate of 2^6, arranged as 16 whole plots split into 2, plus 2 extra plots split into 2.

Whole plot dimensions: 3.25 x 30.5.

Treatments: Combinations of:-

Whole plots

1.	DRILLS	Drills, sowing seed at 380 seeds per m^2 in rows 10 cm (4 in) apart:
	NORDSTEN	Nordsten drill spacing seed irregularly within the row
	STANHAY	Stanhay precision drill
2.	SOWDATE	Dates of sowing:
	22 SEPT	22 September, 1978
	12 OCT	12 October
3.	AUT PEST	Autumn pesticide:
	NONE	None
	ALDICARB	Aldicarb at 5 kg worked in to seedbed

Sub plots

4.	TOTAL N	Total amount of nitrogen fertiliser:
	205	
	295	
5.	N TIME	Times of applying nitrogen fertiliser:
	A	All applied on 5 Apr, 1979
	M A M	40 kg of total applied on 12 Mar, 45 kg applied on 18 May, remainder on 5 Apr
6.	IRRIGATN	Irrigation:
	NONE	None
	FULL	Full (120 mm) to lessen a deficit of 30 mm to 12 mm

plus two extra plots split into two, both whole plots identical and sown by Stanhay drill on 22 September, all N applied on 5 Apr, given aldicarb and full irrigation, testing rates of nitrogen fertiliser (kg N):

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EXTRA
N 0
N 160
N 250
N 340

Irrigation was applied as follows (mm water):

22 June	10
28 June	10
2 July	10
5 July	10
9 July	10
12 July	10
16 July	10
19 July	10
23 July	10
26 July	10
30 July	10
6 Aug	10
Total	120

Standard applications: Manures: (0:14:28) at 350 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 kg on two occasions, on the first in 120 l and the second in 300 l). Growth regulator: Chlormequat at 1.4 kg in 340 l. Fungicide: Carbendazim, tridemorph and maneb ('Cosmic' at 4.0 kg in 340 l) on two occasions. Aphicide: Pirimicarb at 0.14 kg in 340 l.

Seed: Hustler, sown at 174 kg.

Cultivations, etc.:- Heavy spring-tine cultivated, PK applied: 13 Sept, 1978. Aldicarb applied for SOW DATE 22 SEPT and all these plots rotary cultivated: 21 Sept. Aldicarb applied for SOW DATE 12 OCT and all these plots rotary cultivated: 12 Oct. Weedkillers applied: 28 Dec. First N applied: 12 Mar, 1979. Second N applied: 5 Apr. Growth regulator applied to early sowing: 18 Apr. Weedkillers applied: 2 May. Growth regulator applied to late sowing: 8 May. Third N applied: 18 May. Fungicide applied twice: 24 May, 19 June. Aphicide applied: 26 June. Combine harvested: 31 Aug. Previous crops: Beans 1977, early potatoes 1978.

NOTE: Measurements were made of plant and shoot numbers, dry weight of tops and ears, leaf areas and nitrate and potassium content four times during the growing season. Weekly measurements were made for soil moisture and plant moisture stress (between April and August). Disease assessments were made during the growing season. Soil samples were taken in February and April to determine their N content.

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79/W/WW/3

GRAIN TONNES/HECTARE

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

SOWDATE DRILLS	22 SEPT	12 OCT	MEAN
NORDSTEN	7.88	7.66	7.77
STANHAY	8.13	7.38	7.75
MEAN	8.00	7.52	7.76

AUT PEST DRILLS	NONE	ALDICARB	MEAN
NORDSTEN	7.40	8.14	7.77
STANHAY	7.46	8.05	7.75
MEAN	7.43	8.10	7.76

AUT PEST SOWDATE	NONE	ALDICARB	MEAN
22 SEPT	7.48	8.53	8.00
12 OCT	7.38	7.66	7.52
MEAN	7.43	8.10	7.76

TOTAL N DRILLS	205	295	MEAN
NORDSTEN	7.76	7.78	7.77
STANHAY	7.75	7.76	7.75
MEAN	7.76	7.77	7.76

TOTAL N SOWDATE	205	295	MEAN
22 SEPT	7.91	8.09	8.00
12 OCT	7.60	7.45	7.52
MEAN	7.76	7.77	7.76

TOTAL N AUT PEST	205	295	MEAN
NONE	7.43	7.42	7.43
ALDICARB	8.08	8.11	8.10
MEAN	7.76	7.77	7.76

N TIME DRILLS	A	M A M	MEAN
NORDSTEN	7.70	7.84	7.77
STANHAY	7.58	7.93	7.75
MEAN	7.64	7.89	7.76

N TIME SOWDATE	A	M A M	MEAN
22 SEPT	7.95	8.06	8.00
12 OCT	7.33	7.71	7.52
MEAN	7.64	7.89	7.76

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GRAIN TONNES/HECTARE

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

N TIME	A	M A M	MEAN
AUT PEST			
NONE	7.35	7.51	7.43
ALDICARB	7.93	8.26	8.10
MEAN	7.64	7.89	7.76

N TIME	A	M A M	MEAN
TOTAL N			
205	7.70	7.81	7.76
295	7.57	7.96	7.77
MEAN	7.64	7.89	7.76

IRRIGATN	NONE	FULL	MEAN
DRILLS			
NORDSTEN	7.21	8.33	7.77
STANHAY	7.13	8.38	7.75
MEAN	7.17	8.35	7.76

IRRIGATN	NONE	FULL	MEAN
SOWDATE			
22 SEPT	7.28	8.72	8.00
12 OCT	7.06	7.99	7.52
MEAN	7.17	8.35	7.76

IRRIGATN	NONE	FULL	MEAN
AUT PEST			
NONE	6.84	8.01	7.43
ALDICARB	7.50	8.69	8.10
MEAN	7.17	8.35	7.76

IRRIGATN	NONE	FULL	MEAN
TOTAL N			
205	7.16	8.35	7.76
295	7.18	8.35	7.77
MEAN	7.17	8.35	7.76

IRRIGATN	NONE	FULL	MEAN
N TIME			
A	6.99	8.29	7.64
M A M	7.35	8.42	7.89
MEAN	7.17	8.35	7.76

EXTRA	N 0	N 160	N 250	N 340	MEAN
	3.87	7.95	9.12	8.14	7.27

GRAND MEAN 7.71

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79/W/WW/3

GRAIN TONNES/HECTARE

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

TABLE	EXTRA	DRILLS	SOWDATE	AUT PEST
SED	0.786	0.183	0.185	0.186

TABLE	TOTAL N	N TIME	IRRIGATN	DRILLS SOWDATE
SED	0.210	0.201	0.185	0.258

TABLE	DRILLS AUT PEST	SOWDATE AUT PEST	DRILLS TOTAL N	SOWDATE TOTAL N
SED	0.260	0.264	0.298	0.285

TABLE	AUT PEST TOTAL N	DRILLS N TIME	SOWDATE N TIME	AUT PEST N TIME
SED	0.291	0.272	0.281	0.294

TABLE	TOTAL N N TIME	DRILLS IRRIGATN	SOWDATE IRRIGATN	AUT PEST IRRIGATN
SED	0.301	0.258	0.261	0.260

TABLE	TOTAL N IRRIGATN	N TIME IRRIGATN
SED	0.288	0.285

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

STRATUM	DF	SE	CV%
WP	8	0.496	6.4

MEAN DM% 86.8

SUB PLOT AREA HARVESTED 0.00125

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79/R/WW/4

WINTER WHEAT

SEED RATES AND DIVIDED N DRESSINGS

Object: To study the effects of seed rates and rates and times of applying nitrogen fertiliser on the growth and yield of winter wheat - Gt. Harpenden II.

Sponsors: J. McEwen, R. Moffitt.

Design: 2 randomised blocks of 2 x 4 x 3.

Whole plot dimensions: 4.26 x 9.14.

Treatments: All combinations of:-

1. SEEDRATE — Seed rate (kg):

   100
   200

2. TOTAL N — Total nitrogen fertiliser (kg N):

   75
   100
   125
   150

3. N TIME — Times of applying nitrogen fertiliser:

MA	25 kg N of the total applied 23 Mar, remainder 17 Apr
A	All applied 17 Apr
MAJ	25 kg N of the total applied 23 Mar, 25 kg N applied 18 June, remainder 17 Apr

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: Dicamba, mecoprop and MCPA (as 'Banlene Plus' at 4.2 kg in 220 l). Fungicides: Triadimefon at 0.13 kg in 220 l. Growth regulator: Chlormequat at 1.7 kg in 220 l.

Seed: Flanders.

Cultivations, etc.:- Ploughed: 11 Oct, 1978. Rotary harrowed, PK applied: 16 Oct. Rotary harrowed: 17 Oct. Seed sown: 18 Oct. Growth regulator applied: 3 May. Weedkillers applied: 8 May. Fungicide applied: 27 June. Combine harvested: 29 Aug. Previous crops: Barley 1977, beans 1978.

NOTES: (1) Nitrate contents in stems were estimated at intervals during the season.
(2) Tiller counts were made in April and ear counts in July.
(3) 1000 grain weights were measured and grain was analysed for N percentage.

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79/R/WW/4

GRAIN TONNES/HECTARE

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

TOTAL N / SEEDRATE	75	100	125	150	MEAN
100	5.89	6.58	6.54	6.72	6.43
200	6.45	6.71	7.50	7.50	7.04
MEAN	6.17	6.64	7.02	7.11	6.74

N TIME / SEEDRATE	MA	A	MAJ	MEAN
100	6.79	6.47	6.05	6.43
200	6.92	7.29	6.91	7.04
MEAN	6.85	6.88	6.48	6.74

N TIME / TOTAL N	MA	A	MAJ	MEAN
75	6.86	6.37	5.27	6.17
100	6.38	6.77	6.77	6.64
125	7.07	7.23	6.77	7.02
150	7.10	7.13	7.10	7.11
MEAN	6.85	6.88	6.48	6.74

SEEDRATE	N TIME / TOTAL N	MA	A	MAJ
100	75	6.60	6.06	5.00
	100	6.73	6.56	6.44
	125	6.77	6.76	6.10
	150	7.06	6.48	6.64
200	75	7.12	6.68	5.55
	100	6.03	6.98	7.11
	125	7.37	7.70	7.43
	150	7.14	7.79	7.56

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

TABLE	SEEDRATE	TOTAL N	N TIME	SEEDRATE TOTAL N
SED	0.167	0.237	0.205	0.334

TABLE	SEEDRATE N TIME	TOTAL N N TIME	SEEDRATE TOTAL N N TIME
SED	0.290	0.410	0.579

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

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.579	8.6

MEAN DM% 83.8

PLOT AREA HARVESTED 0.00290

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79/R/WW/5

WINTER WHEAT

FUNGICIDES

Object: To study the effects of a range of fungicides and two methods of application on the incidence of diseases and on the yield of winter wheat - Webbs.

Sponsors: J.F. Jenkyn, R.D. Prew.

Design: 3 randomised blocks of 14 plots.

Whole plot dimensions: 2.13 x 13.4.

Treatments:

FUNGCIDE	Fungicides and methods of application:
NONE	None
BAS389 S	'BAS 389' as a seed dressing at 1 g a.i. per kg of seed
BENOD F	Benodanil as a foliar spray at 1.1 kg
BTS S	'BTS 40542' as a seed dressing at 0.2 g a.i. per kg of seed
BTS F	'BTS 40542' as a foliar spray at 0.4 kg
CARBOX S	Carboxin as a seed dressing at 1.5 g per kg of seed
CARBOX F	Carboxin as a foliar spray at 1.1 kg
EL228 S	'EL 228' as a seed dressing at 0.2 g a.i. per kg of seed
EL228 F	'EL 228' as a foliar spray at 0.04 kg a.i.
H719 S	'H 719' as a seed dressing at 1.5 g a.i. per kg of seed
H719 F	'H 719' as a foliar spray at 1.1 kg a.i.
OM S	Organo-mercury as a seed dressing ('Agrosan GN' at 2.2 g per kg of seed)
PP296 F	'PP 296' as a foliar spray at 0.125 kg
TRIAD S	Triadimefon as a seed dressing at 0.5 g per kg of seed

NOTES: (1) All seed dressing treatments (except organo-mercury) were sown at 220 kg. All remaining treatments were sown at 190 kg.
(2) Foliar sprays were applied on 1 June, 1979 in 340 l.

Basal applications: Manures: (10:23:23) at 250 kg. 'Nitro-Chalk' at 460 kg. Weedkillers: Paraquat at 0.42 kg ion in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 0.25 kg in 220 l).

Seed: Kador.

Cultivations, etc.:- Deep-tine cultivated twice: 31 Aug, 1978 and 1 Sept. Heavy spring-tine cultivated: 14 Sept. NPK applied: 17 Oct. Paraquat applied: 18 Oct. Rolled and disc harrowed: 23 Oct. Seed sown: 24 Oct. N applied: 19 Apr, 1979. 'Brittox' applied: 14 May. Combine harvested: 31 Aug. Previous cropping: Wheat 1977, barley 1978.

NOTE: Foot and root rots were assessed in spring and summer. Leaf diseases were assessed in late summer.

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79/R/WW/5

GRAIN TONNES/HECTARE

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

FUNGCIDE	
NONE	4.77
BAS389 S	5.13
BENOD F	4.50
BTS S	5.65
BTS F	5.38
CARBOX S	5.16
CARBOX F	4.85
EL228 S	5.43
EL228 F	4.89
H719 S	4.68
H719 F	5.11
OM S	5.55
PP296 F	5.43
TRIAD S	5.68
MEAN	5.16

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

TABLE	FUNGCIDE
SED	0.407

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.498	9.7

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00195

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79/R/WW/6

WINTER WHEAT

EFFECTS OF SEPTORIA

Object: To study the effects of a range of treatments on the incidence of Septoria and on the yield of winter wheat - Gt. Harpenden II.

Sponsors: J.F. Jenkyn, J. King (M.A.F.F.).

Design: 2 randomised blocks of 8, all treatment combinations duplicated in each block.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. SEP SEED — Septoria infection of seed:

   NONE
   INFECTED

2. SEEDRESS — Seed dressing:

   NONE — None
   ORG MERC — Organo-mercury (as 'Agrosan GN' at 2.2 g per kg seed)

3. SEP STRW — Septoria infected of straw applied to seedbed on 17 Oct, 1978:

   NONE
   INFECTED

NOTES: (1) An intended test of foliar fungicide was not applied.
(2) Infected straw was applied to plots at 600 kg per ha.
(3) All plots were separated at their sides by 4.27 m and at their ends by 9.14 m. Separations were sown to winter barley, variety Athene, seed dressed with ethirimol.
(4) Irrigation was applied to the whole experimental area once a week, overnight, at 5 mm per occasion, when there had been negligible rain in the preceding week. It was applied on 20 June, 27 June, 4 July, 11 July, 18 July, 25 July.

Basal applications: Manures: (0:20:20) at 310 kg. 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 4.2 kg in 220 l). Growth regulator: Chlormequat at 1.7 kg in 220 l.

Seed: Atou, sown at 190 kg.

Cultivations, etc.:- Ploughed: 11 Oct, 1978. Rotary harrowed, PK applied: 16 Oct. Power harrowed: 17 Oct. Seed sown: 18 Oct. N applied: 3 May, 1979. Weedkillers applied: 8 May. Growth regulator applied: 1 June. Winter barley separations harvested: 15 Aug. Plots combine harvested: 29 Aug. Previous cropping: Barley 1977, beans 1978.

NOTE: Seedling and leaf infection by Septoria was assessed periodically during the season.

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79/R/WW/6

GRAIN TONNES/HECTARE

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

SEEDRESS	NONE	ORG MERC	MEAN
SEP SEED			
NONE	6.33	6.22	6.27
INFECTED	6.13	6.29	6.21
MEAN	6.23	6.25	6.24

SEP STRW	NONE	INFECTED	MEAN
SEP SEED			
NONE	6.37	6.17	6.27
INFECTED	6.20	6.22	6.21
MEAN	6.29	6.20	6.24

SEP STRW	NONE	INFECTED	MEAN
SEEDRESS			
NONE	6.33	6.13	6.23
ORG MERC	6.24	6.26	6.25
MEAN	6.29	6.20	6.24

SEEDRESS	NONE		ORG MERC	
SEP STRW	NONE	INFECTED	NONE	INFECTED
SEP SEED				
NONE	6.46	6.19	6.28	6.15
INFECTED	6.19	6.07	6.21	6.37

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

TABLE	SEP SEED	SEEDRESS	SEP STRW	SEP SEED SEEDRESS
SED	0.155	0.155	0.155	0.219

TABLE	SEP SEED SEP STRW	SEEDRESS SEP STRW	SEP SEED SEEDRESS SEP STRW
SED	0.219	0.219	0.309

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

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.438	7.0

GRAIN MEAN DM% 85.0

PLOT AREA HARVESTED 0.00195

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79/R/WW/7

WINTER WHEAT

EFFECTS OF SULPHUR

Object: To study the effects of sulphur on amino acid content, flour quality and yield of winter wheat - Webbs.

Sponsors: B.J. Miflin, M.A. Kirkman.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 2.66 x 7.62.

Treatments:

N S	Rates and times of nitrogen and sulphur fertilisers (kg element): Nitrogen		Sulphur, as potassium sulphate	
	19 Apr as 'Nitro-Chalk'	29 June as urea	3 May	29 June
NE0 S00	120	0	0	0
NE0 SE0	120	0	20	0
NEL S00	120	80	0	0
NEL SE0	120	80	20	0
NEL S0L	120	80	0	20
NEL SEL	120	80	20	20

NOTE: Urea and potassium sulphate were applied, either singly or together, in 1000 l.

Basal applications: Manures: (10:23:23) at 250 kg. Weedkillers: Paraquat at 0.42 kg ion in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 2.5 kg in 220 l).

Seed: Flinor, sown at 190 kg.

Cultivations, etc.:- Deep-tine cultivated twice: 31 Aug, 1978 and 1 Sept. Heavy spring-tine cultivated: 14 Sept. NPK applied: 17 Oct. Paraquat applied: 18 Oct. Disc harrowed: 23 Oct. Seed sown: 25 Oct. 'Brittox' applied: 14 May. Combine harvested: 30 Aug. Previous cropping: Barley 1977, barley 1978.

NOTE: The grain was tested for bread making quality, N and sulphur content.

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79/R/WW/7

GRAIN TONNES/HECTARE

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

	N S
NEO SOO	5.24
NEO SEO	5.39
NEL SOO	5.27
NEL SEO	5.26
NEL SOL	5.60
NEL SEL	5.15
MEAN	5.32

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

TABLE	N S
SED	0.249

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.306	5.7

GRAIN MEAN DM% 87.2

PLOT AREA HARVESTED 0.00203

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79/R/WW/8

WINTER WHEAT

INTEGRATED PEST CONTROL

Object: To study the effects of chemical and biological pest control treatments on the incidence of pests and beneficial insects and on yield of winter wheat - Stackyard.

Sponsors: W. Powell, R. Bardner, G.J.W. Dean, C.A. Edwards, J.R. Lofty, K.E. Fletcher, J.W. Stephenson, A. Dewar, N. Wilding, R.T. Plumb.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 19.2 x 19.2.

Treatments:

TREATMNT	Chemical and biological treatments:
NONE	None
APHICIDE	Aphicide - Pirimicarb at 0.14 kg in 550 l on 26 June, 1979
BIOLOGIC	Biological control of aphids by the release of 14 Sitobion avenae and 12 Metopolophium dirhodum per square metre, both species infected with Entomophthora aphidis, on 22 June, 1979
MULTCHEM	Multiple chemical treatments: Aldicarb at 5 kg to the seedbed on 17 Oct, 1978 Metaldehyde at 31 kg on 31 Oct Omethoate at 0.2 kg in 280 l on 15 May, 1979

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 500 kg. Autumn weedkiller: Chlortoluron at 5.6 kg in 220 l. Spring weedkiller: Mecoprop at 2.5 kg in 220 l.

Seed: Flanders, undressed, sown at 190 kg.

Cultivations, etc.:- Ploughed: 12 Oct, 1978. Disc harrowed: 16 Oct. Rotary harrowed: 18 Oct. Seed sown: 19 Oct. Autumn weedkiller applied: 20 Oct. N applied: 27 Apr, 1979. Spring weedkiller applied: 15 May. Combine harvested: 30 Aug. Previous cropping: Wheat 1977, spring oats 1978.

NOTE: Aphid counts were made weekly between June and early August and Entomophthora infection was assessed. Slugs and stem boring insects were counted and the incidence of barley yellow dwarf virus assessed. Polyphagous predators and aphid-specific predators and parasites were sampled regularly between late May and early August.

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79/R/WW/8

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	APHICIDE	BIOLOGIC	MULTCHEM	MEAN
	7.21	7.14	7.03	7.44	7.20

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

TABLE	TREATMNT
SED	0.241

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.296	4.1

GRAIN MEAN DM% 84.3

PLOT AREA HARVESTED 0.00410

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79/R/WW/9

WINTER WHEAT

PARASITES AND PREDATORS OF INSECT PESTS

Object: To study the effects of two insecticides, applied separately and together, on the parasites and predators and on the yield of winter wheat - Stackyard.

Sponsors: R. Bardner, J.R. Lofty, K.E. Fletcher.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 10.7 x 21.4.

Treatments: All combinations of:-

1.	INS E	Insecticide applied early:
	NONE	None
	ALDICARB	Aldicarb at 5 kg as 10% granules to the seedbed on 17 Oct, 1978
2.	INS L	Insecticide applied late:
	NONE	None
	CHLORPYR	Chlorpyrifos at 1.17 kg as a foliar spray in 550 l on 15 May, 1979

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 500 kg. Autumn weedkiller: Chlortoluron at 5.6 kg in 220 l. Spring weedkiller: Mecoprop at 2.5 kg in 220 l.

Seed: Flanders, sown at 190 kg.

Cultivations, etc.:- Ploughed: 12 Oct, 1978. Disc harrowed: 16 Oct. Rotary harrowed, seed sown: 18 Oct. Autumn weedkiller applied: 20 Oct. N applied: 27 Apr, 1979. Spring weedkiller applied: 15 May. Combine harvested: 29 Aug. Previous cropping: Fallow 1977, wheat 1978.

NOTE: Incidence of ground beetles was assessed weekly, of wheat blossom midge larvae and pupae in soil in November and December and all arthropods in soil from April until harvest. Incidence of shoot borers was assessed in April, adult wheat blossom midge and other flying insects in June and thrips in July.

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79/R/WW/9

GRAIN TONNES/HECTARE

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

INS L / INS E	NONE	CHLORPYR	MEAN
NONE	6.52	6.77	6.65
ALDICARB	6.60	7.28	6.94
MEAN	6.56	7.02	6.79

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

TABLE	INS E	INS L	INS E INS L
SED	0.128	0.128	0.181

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.221	3.3

GRAIN MEAN DM% 86.3

PLOT AREA HARVESTED 0.00607

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79/S/WW/1

WINTER WHEAT

RATES AND TIMES OF N AND FUNGICIDE

Object: To study the effects of rates, times and forms of nitrogen fertiliser and of two fungicides on the incidence of diseases and on the yields and nitrogen uptake of wheat - Saxmundham: Grove Plot.

Sponsors: F.V. Widdowson, A. Penny.

Design: Half replicate of 4 x 2^4 plus 8 extra plots.

Whole plot dimensions: 2.74 x 6.40.

Treatments: Combinations of:-

1. N AUTUMN		Nitrogen fertiliser in autumn (4 Oct, 1978):
	0	None
	IBDU 1	Isobutylidene diurea at 50 kg N
2. N SPRING		Nitrogen fertiliser in spring (18 Apr, 1979):
	0	None
	NC 1	'Nitro-Chalk 25% N' at 50 kg N
	NC 2	'Nitro-Chalk 25% N' at 100 kg N
	NC 3	'Nitro-Chalk 25% N' at 150 kg N
3. N SUMMER		Nitrogen fertiliser in summer:
	0	None
	AG 1	'Agsol 26% N' at 50 kg N foliar spray, half on 12 June, half on 5 July
4. FUNGCIDE(1)		Fungicide:
	0	None
	BN+CA+MA	Benomyl on 16 May, carbendazim + maneb on 12 June and on 5 July
5. FUNGCIDE(2)		Fungicide:
	0	None
	BENODANI	Benodanil on 12 June and on 5 July

plus four extra treatments (duplicated), all given FUNGCIDE(1) and FUNGCIDE(2):

EXTRA

NCA1NCD2	'Nitro-Chalk' in autumn at 50 kg N, 'Nitro-Chalk' in spring/summer at 100 kg N, dressing divided 1/5 on 6 Mar, 3/5 on 18 Apr, and 1/5 on 16 May
NCA1NCD3	As previous treatment but 150 kg N
IBA1NCD2	Isobutylidene diurea in autumn at 50 kg N, 'Nitro-Chalk' in spring/summer at 100 kg N dressing divided as above
IBA1NCD3	As previous treatment but 150 kg N.

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NOTE: Test fungicides were applied in 280 l. Rates: Benomyl at 0.28 kg, carbendazim at 0.25 kg with maneb at 1.6 kg, benodanil at 1.2 kg.

Basal applications: Manures: (0:14:28) at 190 kg. (0:20:20) at 380 kg, combine drilled. Autumn weedkiller: Isoproturon at 2.5 kg in 220 l. Spring weedkiller: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 220 l applied with the growth regulator. Fungicide: Tridemorph at 0.53 kg in 280 l. Growth regulator: Chlormequat at 1.7 kg. Aphicide: Pirimicarb at 0.14 kg in 280 l.

Seed: Maris Huntsman, sown at 180 kg.

Cultivations, etc.:- PK applied: 19 Sept, 1978. Seed sown and autumn test N applied: 4 Oct. Autumn weedkiller applied: 5 Oct. Spring weedkiller and growth regulator applied: 15 May, 1979. Basal fungicide applied: 16 May. Basal insecticide applied: 5 July. Harvested: 21 Aug.

NOTE: Plots were assessed for leaf diseases, numbers of ears, and N percentage in grains.

79/S/WW/1

GRAIN TONNES/HECTARE

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

N SPRING	0	NC 1	NC 2	NC 3	MEAN
N AUTUMN					
0	5.16	7.19	7.98	8.02	7.09
IBDU 1	6.01	7.70	8.29	8.06	7.52
MEAN	5.59	7.45	8.13	8.04	7.30

N SUMMER	0	AG 1	MEAN
N AUTUMN			
0	6.96	7.22	7.09
IBDU 1	7.39	7.64	7.52
MEAN	7.18	7.43	7.30

N SUMMER	0	AG 1	MEAN
N SPRING			
0	5.36	5.82	5.59
NC 1	7.24	7.65	7.45
NC 2	8.15	8.12	8.13
NC 3	7.95	8.14	8.04
MEAN	7.18	7.43	7.30

FUNGCIDE(1)	0	BN+CA+MA	MEAN
N AUTUMN			
0	6.97	7.22	7.09
IBDU 1	7.32	7.71	7.52
MEAN	7.14	7.46	7.30

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GRAIN TONNES/HECTARE

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

FUNGCIDE(1)	0	BN+CA+MA	MEAN
N SPRING			
0	5.64	5.54	5.59
NC 1	7.21	7.68	7.45
NC 2	7.91	8.36	8.13
NC 3	7.82	8.27	8.04
MEAN	7.14	7.46	7.30

FUNGCIDE(1)	0	BN+CA+MA	MEAN
N SUMMER			
0	7.06	7.29	7.18
AG 1	7.23	7.64	7.43
MEAN	7.14	7.46	7.30

FUNGCIDE(2)	0	BENODANI	MEAN
N AUTUMN			
0	7.12	7.07	7.09
IBDU 1	7.51	7.52	7.52
MEAN	7.31	7.30	7.30

FUNGCIDE(2)	0	BENODANI	MEAN
N SPRING			
0	5.53	5.64	5.59
NC 1	7.47	7.42	7.45
NC 2	8.17	8.10	8.13
NC 3	8.07	8.02	8.04
MEAN	7.31	7.30	7.30

FUNGCIDE(2)	0	BENODANI	MEAN
N SUMMER			
0	7.16	7.19	7.18
AG 1	7.46	7.40	7.43
MEAN	7.31	7.30	7.30

FUNGCIDE(2)	0	BENODANI	MEAN
FUNGCIDE(1)			
0	7.18	7.11	7.14
BN+CA+MA	7.44	7.49	7.46
MEAN	7.31	7.30	7.30

EXTRA	NCA1NCD2	NCA1NCD3	IBA1NCD2	IBA1NCD3	MEAN
	8.62	8.54	8.41	8.27	8.46

GRAND MEAN 7.54

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79/S/WW/1

GRAIN TONNES/HECTARE

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

TABLE	N AUTUMN	N SPRING	N SUMMER	FUNGCIDE(1)
SED	0.092	0.131	0.092	0.092

TABLE	FUNGCIDE(2)	N AUTUMN N SPRING	N AUTUMN N SUMMER	N SPRING N SUMMER
SED	0.092	0.185	0.131	0.185

TABLE	N AUTUMN FUNGCIDE(1)	N SPRING FUNGCIDE(1)	N SUMMER FUNGCIDE(1)	N AUTUMN FUNGCIDE(2)
SED	0.131	0.185	0.131	0.131

TABLE	N SPRING FUNGCIDE(2)	N SUMMER FUNGCIDE(2)	FUNGCIDE(1) FUNGCIDE(2)	EXTRA
SED	0.185	0.131	0.131	0.262

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

STRATUM	DF	SE	CV%
WP	10	0.262	3.5

GRAIN MEAN DM% 80.2

PLOT AREA HARVESTED 0.00098

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79/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 - Whittlocks.

Sponsor: J. Lacey.

Design: 2 randomised blocks of 24 plots.

Whole plot dimensions: 4.27 x 13.1.

Treatments: All combinations of:-

1. FUNGCIDE — Broad spectrum fungicides:

CAPTAFOL	Captafol at 1.4 kg
CARB+MAN	Carbendazim at 0.25 kg + maneb at 1.6 kg
BENOMYL	Benomyl (see Note (2))

2. APP TIME — Application times of broad spectrum fungicides:

	3 July	11 July	3 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

NOTES: (1) Treatment sprays were applied in 340 l.
(2) First benomyl sprays were applied at 1.1 kg in error. The intended rate of 0.28 kg was used for both later applications.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) and mecoprop at 1.7 kg in 220 l.

Seed: Highbury, sown at 190 kg.

Cultivations, etc.:- Deep-tine cultivated twice: 31 Oct, 1978 and 2 Nov. Spring-tine cultivated, seed sown: 20 Apr, 1979. Weedkillers applied: 4 June. Combine harvested: 6 Sept. Previous cropping: Winter oats 1977, potatoes 1978.

NOTE: Grain microflora were assessed at fortnightly intervals after heading. Thousand grain weights were measured, and grain was assessed for germination and seedling growth.

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79/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	5.51	5.61	5.82	5.50	5.73	5.55	5.89	5.66
CARB+MAN	5.54	5.66	5.32	5.80	5.57	5.71	5.61	5.60
BENOMYL	5.82	5.54	5.33	5.92	5.86	5.35	6.13	5.71
MEAN	5.62	5.60	5.49	5.74	5.72	5.54	5.87	5.66

APP TIME NONE 5.36

GRAND MEAN 5.62

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

TABLE	FUNGCIDE	APP TIME	FUNGCIDE APP TIME
SED	0.129	0.197	0.341

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

STRATUM	DF	SE	CV%
BLOCK.WP	25	0.341	6.1

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00195

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79/R/B/1

WINTER BARLEY

SOWING DATES, MILDEW CONTROL & GROWTH STUDY

Object: To study the effects of sowing date and mildew control on the incidence of mildew, growth and yield of winter barley - Long Hoos I/II.

Sponsors: A. Bainbridge, J.F. Jenkyn, M.E. Finney, J.N. Gallagher.

Design: 2 blocks of 24 plots with confounding.

Whole plot dimensions: 2.13 x 9.14.

Treatments: All combinations of:-

1. SOW DATE — Dates of sowing:

   6 OCT
   13 OCT
   20 OCT
   1 NOV
   15 NOV
   29 NOV

2. TRIFORIN — Triforine:

   NONE — None
   SEEDRESS — Seed dressed at 2.7 g a.i. per kg of seed

3. TRIDEMOR(1) — Tridemorph in early spring:

   NONE — None
   SPRAYED — Sprayed on 26 Apr, 1979

4. TRIDEMOR(2) — Tridemorph in late spring:

   NONE — None
   SPRAYED — Sprayed on 1 June

NOTES: (1) Tridemorph was applied at 0.53 kg in 340 l
(2) The guard areas between sides of each plot were sown to winter barley, variety Athene, and used for the experiment 'N & Growth Regulator' (see 79/R/B/5).

Basal applications: Manures: (0:20:20) at 310 kg. 'Nitro-Chalk' at 370 kg. Weedkillers: Mecoprop at 2.5 l in 220 l. Irrigation: 25 mm.

Seed: Hoppel, sown at 180 kg.

Cultivations, etc.:- Ploughed: 22 Sept, 1978. Rolled: 27 Sept. PK applied, rotary harrowed: 4 Oct. Irrigation applied: 9 Nov. N applied: 3 May, 1979. Weedkiller applied: 9 May. All plots except SOW DATE 29 NOV harvested: 6 Aug. SOW DATE 29 NOV harvested: 15 Aug. Previous crops: Spring barley 1977, Winter beans 1978.

NOTE: Seedling emergence counts were made in April. Tillers and grains per ear were counted in July. Disease assessments were made in June and July.

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79/R/B/1

GRAIN TONNES/HECTARE

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

TRIFORIN SOW DATE	NONE	SEEDRESS	MEAN
6 OCT	7.82	7.88	7.85
13 OCT	8.03	8.03	8.03
20 OCT	7.93	7.82	7.87
1 NOV	7.82	8.32	8.07
15 NOV	7.03	7.56	7.29
29 NOV	5.83	5.52	5.68
MEAN	7.41	7.52	7.47

TRIDEMOR(1) SOW DATE	NONE	SPRAYED	MEAN
6 OCT	7.35	8.34	7.85
13 OCT	7.84	8.23	8.03
20 OCT	7.74	8.00	7.87
1 NOV	7.95	8.19	8.07
15 NOV	7.36	7.22	7.29
29 NOV	5.90	5.45	5.68
MEAN	7.36	7.57	7.47

TRIDEMOR(1) TRIFORIN	NONE	SPRAYED	MEAN
NONE	7.30	7.52	7.41
SEEDRESS	7.42	7.63	7.52
MEAN	7.36	7.57	7.47

TRIDEMOR(2) SOW DATE	NONE	SPRAYED	MEAN
6 OCT	7.85	7.84	7.85
13 OCT	7.91	8.16	8.03
20 OCT	7.67	8.07	7.87
1 NOV	7.97	8.17	8.07
15 NOV	7.27	7.32	7.29
29 NOV	5.28	6.08	5.68
MEAN	7.32	7.61	7.47

TRIDEMOR(2) TRIFORIN	NONE	SPRAYED	MEAN
NONE	7.24	7.58	7.41
SEEDRESS	7.41	7.64	7.52
MEAN	7.32	7.61	7.47

TRIDEMOR(2) TRIDEMOR(1)	NONE	SPRAYED	MEAN
NONE	7.18	7.54	7.36
SPRAYED	7.47	7.68	7.57
MEAN	7.32	7.61	7.47

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79/R/B/1

GRAIN TONNES/HECTARE

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

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

TABLE	SOW DATE	TRIFORIN	TRIDEMOR(1)	TRIDEMOR(2)
SED	0.222	0.128	0.128	0.128

TABLE	SOW DATE TRIFORIN	SOW DATE TRIDEMOR(1)	TRIFORIN TRIDEMOR(1)	SOW DATE TRIDEMOR(2)
SED	0.314	0.314	0.181	0.314

TABLE	TRIFORIN TRIDEMOR(2)	TRIDEMOR(1) TRIDEMOR(2)
SED	0.181	0.181

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.444	6.0

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00150

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79/W/B/2

WINTER & SPRING BARLEY

MILDEW SENSITIVITY TO ETHIRIMOL

Object: To study the effects of dressing barley seed with ethirimol on the subsequent sensitivity of mildew and on the yield of winter and spring barley - Warren Field I.

Sponsor: D.W. Hollamon.

Design: Winter barley: 4 blocks of 4 plots split into 2
Spring barley: 4 blocks of 4 plots

Whole plot dimensions: 8.53 x 8.53.

Treatments:

To WINTER BARLEY All combinations of:-

Whole plots

1. SEEDRESS		Seed dressing to winter barley:
	WO	None
	WE	Ethirimol
2. FUNG SB		Fungicide applied to adjacent plots of spring barley:
	S OT	No fungicides to one adjacent plot, tridemorph to the other
	S ET	Ethirimol seed dressing to one adjacent plot, tridemorph to the other

Sub plots

3. POSITION		Position of winter barley plots in relation to spring barley plots testing seed dressing (S O & S E below):
	NORTH	
	SOUTH	

To SPRING BARLEY All combinations of:-

1. SEEDRESS		Seed dressing to spring barley:
	SO	None
	SE	Ethirimol
2. FUNG WB		Fungicide applied to both adjacent plots of winter barley:
	W O	None
	W E	Ethirimol seed dressing

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79/W/B/2

NOTES: (1) Plot dimensions were 8.53 x 8.53 and plots were arranged in sets of three - a central spring barley plot with flanking plots of winter barley. Sides of sets of three plots were separated by 'plots' of spring barley of the same dimensions sprayed with tridemorph, ends of plots were separated by strips of spring barley 9.14 wide sprayed with tridemorph.
(2) Tridemorph was applied at 0.53 kg in 250 l.

Basal applications: Manures: (0:20:20) at 310 kg, N at 100 kg as 'Nitro-Chalk'. Weedkillers: Mecoprop with bromoxynil and ioxynil ('Brittox' at 2.5 kg in 250 l). Bromoxynil with ioxynil ('Oxytril CM' at 0.7 kg in 250 l).

Seed: Winter barley, Hoppel sown at 170 kg.
Spring barley, Wing sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 11 Sept, 1978. Deep-tine cultivated: 18 Sept. PK applied: 30 Oct. Disced twice: 13 Nov, 14 Nov. Winter barley sown: 15 Nov. Heavy spring-tine cultivated for spring sowing: 17 Apr, 1979. Spring-tine cultivated with crumbler attached: 18. Apr. Spring barley sown: 19 Apr. N applied to all plots: 20 Apr. 'Brittox' applied to winter barley: 15 May. 'Oxytril CM' applied to spring barley: 5 June. Tridemorph applied: 18 June. Winter barley combine harvested: 15 Aug. Spring barley combine harvested: 21 Aug. Previous crops: Potatoes 1977, winter wheat 1978.

NOTE: Leaf samples were taken for mildew (Erysiphe graminis) measurements during June.

SPRING BARLEY

GRAIN TONNES/HECTARE

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

FUNG WB / SEEDRESS	W 0	W E	MEAN
S0	5.37	5.28	5.32
SE	5.58	5.59	5.58
MEAN	5.47	5.43	5.45

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

TABLE	SEEDRESS	FUNG WB	SEEDRESS FUNG WB
SED	0.216	0.216	0.306

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.432	7.9

GRAIN MEAN DM% 81.4

PLOT AREA HARVESTED 0.00243

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79/W/B/2

WINTER BARLEY

GRAIN TONNES/HECTARE

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

FUNG SB	S OT	S ET	MEAN
SEEDRESS			
WO	5.75	5.71	5.73
WE	5.92	5.91	5.91
MEAN	5.83	5.81	5.82

POSITION	NORTH	SOUTH	MEAN
SEEDRESS			
WO	5.76	5.70	5.73
WE	5.66	6.16	5.91
MEAN	5.71	5.93	5.82

POSITION	NORTH	SOUTH	MEAN
FUNG SB			
S OT	5.78	5.89	5.83
S ET	5.64	5.98	5.81
MEAN	5.71	5.93	5.82

FUNG SB	S OT		S ET	
POSITION	NORTH	SOUTH	NORTH	SOUTH
SEEDRESS				
WO	5.96	5.53	5.56	5.87
WE	5.59	6.24	5.73	6.09

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

TABLE	SEEDRESS	FUNG SB	SEEDRESS FUNG SB
SED	0.196	0.196	0.277

TABLE	SEEDRESS* POSITION	FUNG SB* POSITION	SEEDRESS* FUNG SB POSITION
SED	0.229	0.229	0.324

* ONLY WHEN COMPARING MEANS WITH SAME LEVEL OF POSITION

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.392	6.7
BLOCK.WP.SP	12	0.336	5.8

GRAIN MEAN DM% 84.1

SUB PLOT AREA HARVESTED 0.00243

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79/R/B/5

WINTER BARLEY

N & GROWTH REGULATOR

Object: To study the effects of a growth regulator and rates and times of applying nitrogen on the yield of winter barley - Long Hoos I/II.

Sponsors: F.V. Widdowson, J.F. Jenkyn.

Design: 4 randomised blocks of 13 plots.

Whole plot dimensions: 2.13 x 9.14.

Treatments: All combinations of:-

1. E N TIME — Times of applying early nitrogen:

FEB/MAR	30 kg of total early N applied 1 Mar, 1979, remainder 2 Apr.
MAR	All early N applied 2 Apr.

2. E N RATE — Total early nitrogen rate (kg N):

60
90

3. L N G — Late nitrogen (kg N) and growth regulator:

NONE	None
30 APR	30 kg applied 25 Apr. No growth regulator
30 APR+G	30 kg applied 25 Apr. Mepiquat chloride + ethephon (as 'Terpal' applied at 2.5 l) in 280 l

plus one extra plot:

90F/M+G	90 kg N total applied: 30 kg N 1 Mar, 60 kg N 2 Apr. Mepiquat chloride + ethephon applied at above rate on 25 May

NOTES: (1) Planned dates of applying early nitrogen treatments were not achieved because of wet weather.
(2) The guard areas between sides of each plot were sown to winter barley, variety Hoppel, and used for the experiment 'Sowing Dates, Mildew Control and Growth Study' (see 79/R/B/1).

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: Mecoprop at 2.5 l in 220 l. Irrigation: 25 mm water.

Seed: Athene, sown at 160 kg.

Cultivations, etc.:- Ploughed: 22 Sept, 1978. Rolled: 27 Sept. PK applied, rotary harrowed: 4 Oct. Seed sown: 6 Oct. Irrigated: 9 Nov. Weedkiller applied: 9 May, 1979. Harvested: 6 Aug. Previous crops: Spring barley 1977, Winter beans 1978.

NOTE: Soil samples were taken in spring to a depth of 90 cm to determine mineral N content. Nitrogen percentages of grain were measured. Leaf disease and crop height were assessed in late June.

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79/R/B/5

GRAIN TONNES/HECTARE

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

E N RATE	60	90	MEAN
E N TIME			
FEB/MAR	8.30	8.67	8.49
MAR	8.46	8.98	8.72
MEAN	8.38	8.82	8.60

L N G	NONE	30 APR	30 APR+G	MEAN
E N TIME				
FEB/MAR	7.90	8.63	8.93	8.49
MAR	8.44	8.65	9.05	8.72
MEAN	8.17	8.64	8.99	8.60

L N G	NONE	30 APR	30 APR+G	MEAN
E N RATE				
60	7.77	8.44	8.93	8.38
90	8.57	8.84	9.06	8.82
MEAN	8.17	8.64	8.99	8.60

	L N G	NONE	30 APR	30 APR+G
E N TIME	E N RATE			
FEB/MAR	60	7.58	8.45	8.88
	90	8.23	8.80	8.99
MAR	60	7.97	8.42	8.98
	90	8.92	8.88	9.13

90F/M+G 8.62

GRAND MEAN 8.60

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

TABLE	E N TIME	E N RATE	L N G	E N TIME E N RATE
SED	0.119	0.119	0.146	0.168

TABLE	E N TIME L N G	E N RATE L N G	E N TIME E N RATE L N G & 90F/M+G
SED	0.206	0.206	0.291

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

STRATUM	DF	SE	CV%
BLOCK.WP	36	0.412	4.8

GRAIN MEAN DM% 86.3

PLOT AREA HARVESTED 0.00195

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79/R/B/6

WINTER BARLEY

TIMES OF APPLYING TRIDEMORPH & DEMETON-S-METHYL

Object: To study the effects of times of applying tridemorph and demeton-s-methyl on the incidence of mildew, aphids and aphid-borne viruses and on the yield of winter barley - Scout.

Sponsors: A. Bainbridge, M.E. Finney, J.F. Jenkyn, R.T. Plumb.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 2.13 x 6.10.

Treatments: All combinations of:-

1. TRI A Tridemorph in autumn (17 Nov, 1978):

   NONE
   SPRAYED

2. TRI ES Tridemorph in early spring (26 Apr, 1979):

   NONE
   SPRAYED

3. TRI LS Tridemorph in late spring (1 June):

   NONE
   SPRAYED

plus two extra treatments:

DEMETON	Times of applying demeton-s-methyl:
AUTUMN	17 Nov, 1978
SPRING	1 June, 1979

NOTES: (1) Tridemorph was applied at 0.53 kg in 340 l.
(2) Demeton-s-methyl was applied at 0.25 kg in 340 l

Basal applications: Manures: FYM at 20 t. (10:23:23) at 250 kg combine drilled. 'Nitro-Chalk' at 380 kg. Weedkillers: Paraquat at 0.42 kg ion in 220 l. Methabenzthiazuron at 2.35 kg in 220 l.

Seed: Sonja, sown at 190 kg.

Cultivations, etc.:- FYM applied: 25 Aug, 1978. Ploughed: 7 Sept. Paraquat applied: 3 Oct. Seed sown: 5 Oct. Methabenzthiazuron applied: 12 Oct. N applied: 17 Apr, 1979. Harvested: 5 Aug. Previous crops: Winter barley 1977 and 1978.

NOTES: (1) Seedling emergence counts were made in November and in April.
(2) Foliar diseases were assessed in November, June and July. Tillers and grains per ear were counted in July.

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79/R/B/6

GRAIN TONNES/HECTARE

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

TRI ES / TRI A	NONE	SPRAYED	MEAN
NONE	6.63	6.93	6.78
SPRAYED	6.91	6.81	6.86
MEAN	6.77	6.87	6.82

TRI LS / TRI A	NONE	SPRAYED	MEAN
NONE	6.73	6.83	6.78
SPRAYED	6.93	6.79	6.86
MEAN	6.83	6.81	6.82

TRI LS / TRI ES	NONE	SPRAYED	MEAN
NONE	6.64	6.90	6.77
SPRAYED	7.02	6.72	6.87
MEAN	6.83	6.81	6.82

TRI A	TRI LS / TRI ES	NONE	SPRAYED
NONE	NONE	6.49	6.78
	SPRAYED	6.98	6.88
SPRAYED	NONE	6.80	7.02
	SPRAYED	7.06	6.56

DEMETON	AUTUMN	SPRING	MEAN
	6.85	6.84	6.85

GRAND MEAN 6.82

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

TABLE	DEMETON	TRI A	TRI ES	TRI LS
SED	0.251	0.126	0.126	0.126

TABLE	TRI A TRI ES	TRI A TRI LS	TRI ES TRI LS	TRI A TRI ES TRI LS & DEMETON
SED	0.178	0.178	0.178	0.251

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.308	4.5

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00130

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79/R/B/7 and 79/W/B/7

SPRING BARLEY

VARIETIES AND N

Object: To study the yields of some of the newer varieties of barley; a growth regulator and three rates of nitrogen are also tested - Rothamsted (R) Bylands and Woburn (W) Far Field I.

Sponsor: R. Moffitt.

Design: 3 randomised blocks of 10 x 4 criss cross.

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

Column plots

1. VARIETY	Varieties (all seed purchased from standard commercial sources, seed vigour not tested except as stated):	
	ATHOS	Athos
	DRAM	Dram
	GEORG	Georgie
	GEORG H	Georgie, high vigour seed ex R.H.M.
	GEORG L	Georgie, low vigour seed ex R.H.M.
	GOLDMARK	Goldmarker
	JUPITER	Jupiter
	MAGNUM	Magnum
	MINAK	Minak
	PORTHOS	Porthos

Row plots

2. N GR	Nitrogen fertiliser (kg N) and growth regulator:	
	38	38
	75	75
	113	113
	113 M+E	113 + mepiquat chloride and ethephon (as 'Terpal' at 2.45 kg in 220 l (R), in 250 l (W))

Basal applications:
Bylands (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Mecoprop at 1.6 kg and bromoxynil with ioxynil (as 'Oxytril CM' at 1.4 kg) in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.
Far Field I (W): Manures: (0:20:20) at 310 kg, combine drilled.
Weedkillers: Bromoxynil with ioxynil ('Oxytril CM' at 2.1 kg in 250 l).

Seed: Bylands (R): Varieties sown at 160 kg.
Far Field I (W): Varieties sown at 160 kg.

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79/R/B/7 and 79/W/B/7

Cultivations, etc.:-
Bylands (R): Subsoiled, tines 100 cm apart and 45 cm deep: 15 Nov, 1978. Ploughed: 21 Dec. Rotary harrowed, seed sown: 27 Apr, 1979. N applied: 17 May. Weedkiller applied: 4 June. Fungicide applied: 12 June. Growth regulator applied: 21 June. Combine harvested: 29 Aug. Previous crops: Wheat 1977, barley 1978.
Far Field I (W): Heavy spring-tine cultivated three times: 7 Sept, 1978, 30 Oct, 8 Nov. Subsoiled, tines 140 cm apart and 60 cm deep: 30 Oct. Spring-tine cultivated twice, with crumbler attached: 17 Apr, 1979, 18 Apr. N applied: 18 Apr. Spring-tine cultivated: 19 Apr. Seed sown: 20 Apr. Weedkiller applied: 5 June. Growth regulator applied: 18 June. Combine harvested: 22 Aug. Previous crops: Beans 1977, barley 1978.

79/R/B/7

GRAIN TONNES/HECTARE

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

N GR	38	75	113	113 M+E	MEAN
VARIETY					
ATHOS	2.86	3.53	3.79	3.53	3.43
DRAM	3.24	3.95	4.02	3.75	3.74
GEORG	3.28	3.26	4.03	3.91	3.62
GEORG H	3.23	3.32	3.96	3.09	3.40
GEORG L	3.16	3.90	3.80	3.65	3.63
GOLDMARK	2.87	3.74	3.52	3.76	3.47
JUPITER	3.11	3.39	3.77	3.52	3.45
MAGNUM	2.09	2.72	3.16	2.78	2.69
MINAK	1.79	2.52	2.94	2.75	2.50
PORTHOS	2.95	3.61	3.66	3.34	3.39
MEAN	2.86	3.39	3.66	3.41	3.33

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

TABLE	VARIETY	N GR	VARIETY N GR
SED	0.195	0.194	0.394
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.385
N GR			0.360

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

STRATUM	DF	SE	CV%
BLOCK.VARIETY	18	0.238	7.2
BLOCK.N GR	6	0.238	7.1
BLOCK.VARIETY.N GR	54	0.429	12.9

GRAIN MEAN DM% 83.2

SUB PLOT AREA HARVESTED 0.00130

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79/W/B/7

GRAIN TONNES/HECTARE

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

N GR / VARIETY	38	75	113	113 M+E	MEAN
ATHOS	3.92	5.31	5.95	5.70	5.22
DRAM	3.72	4.26	4.26	5.28	4.38
GEORG	4.44	5.85	6.26	5.96	5.63
GEORG H	4.25	5.57	5.77	5.88	5.37
GEORG L	4.52	5.63	5.77	5.97	5.47
GOLDMARK	4.61	5.80	6.53	6.52	5.87
JUPITER	4.19	5.75	5.66	5.97	5.39
MAGNUM	3.99	5.34	5.67	5.75	5.19
MINAK	4.24	5.38	5.62	5.50	5.18
PORTHOS	3.89	5.13	5.93	6.08	5.26
MEAN	4.18	5.40	5.74	5.86	5.29

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

TABLE	VARIETY	N GR	VARIETY N GR
SED	0.134	0.100	0.239
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.224
N GR			0.227

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

STRATUM	DF	SE	CV%
BLOCK.VARIETY	18	0.164	3.1
BLOCK.N GR	6	0.123	2.3
BLOCK.VARIETY.N GR	54	0.259	4.9

GRAIN MEAN DM% 83.7

SUB PLOT AREA HARVESTED 0.00173

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79/R/B/8 and 79/W/B/8

SPRING BARLEY

PYTHIUM CONTROL

Object: To study the effects of two fungicides and two methods of application on the incidence of Pythium on roots and on the yield of spring barley - Rothamsted (R) Gt. Harpenden I and Woburn (W) Stackyard C.

Sponsor: G.A. Salt.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. FUNGCIDE	Fungicides:
ALIETTE	'Aliette' (Aluminium tris (ethyl phosphonate))
CGA	'CGA 48988' (DL-methyl N-(2,6 dimethyl phenyl)-N-(2-methoxyacetyl)alaninate
2. FUNGMETH	Method of applying fungicides:
FOLIAR	Foliar spray
SEEDBED	Rotavated into the seedbed

plus one extra treatment, duplicated:

NONE

NOTES: (1) 'Aliette' was applied at 15 kg in the seedbed and at 0.68 kg as a foliar spray.
(2) 'CGA 48988' was applied at 1.5 kg in the seedbed and at 0.07 kg as a foliar spray.

Basal applications:
Gt. Harpenden I (R): Manures: (25:0:16) at 450 kg, combine drilled. Weedkillers: Bromoxynil with ioxynil ('Oxytril CM' at 1.4 kg) and mecoprop at 1.7 kg in 220 l.
Stackyard C (W): Manures: (25:0:16) at 450 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 kg in 250 l).

Seed: Porthos, dressed with ethirimol, sown at 160 kg at both sites.

Cultivations, etc.:-
Gt. Harpenden I (R): Ploughed: 3 Aug, 1978. Deep-tine cultivated: 10 Aug. Heavy spring-tine cultivated twice: 24 Aug, 7 Sept. Spring-tine cultivated: 30 Apr, 1979. Seedbed treatments applied, spike rotary cultivated all plots, seed sown: 3 May. Weedkillers applied: 4 June. Foliar treatments applied: 12 June. Combine harvested: 5 Sept. Previous crops: Ryegrass 1977, 1978.

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79/R/B/8 and 79/W/B/8

Stackyard C (W): Ploughed: 22 Nov, 1978. Spring-tine cultivated with crumbler attached, three times: 17 Apr, 1979, 30 Apr, 8 May. NK applied: 27 Apr. Seedbed treatments applied, rotary cultivated, all plots sown: 8 May. Weedkillers applied: 6 June. Foliar treatments applied: 18 June. Combine harvested: 6 Sept. Previous crops: Fallow 1977, 1978.

NOTE: Crop samples were taken in July for assessment of infection by Pythium spp. and other soilborne fungi.

79/R/B/8 GT. HARPENDEN I(R)

GRAIN TONNES/HECTARE

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

FUNGCIDE FUNGMETH	ALIETTE	CGA	MEAN
FOLIAR	4.39	4.15	4.27
SEEDBED	4.53	4.46	4.49
MEAN	4.46	4.31	4.38

NONE 4.48

GRAND MEAN 4.42

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

TABLE	FUNGCIDE	FUNGMETH	FUNGCIDE FUNGMETH & NONE
SED	0.213	0.213	0.302 0.261*

* FOR COMPARISONS INVOLVING NONE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.370	8.4

GRAIN MEAN DM% 86.0

PLOT AREA HARVESTED 0.00195

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79/W/B/8 STACKYARD C(W)

GRAIN TONNES/HECTARE

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

FUNGCIDE FUNGMETH	ALIETTE	CGA	MEAN
FOLIAR	2.20	2.41	2.31
SEEDBED	2.51	2.37	2.44
MEAN	2.36	2.39	2.37

NONE 2.59

GRAND MEAN 2.45

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

TABLE	FUNGCIDE	FUNGMETH	FUNGCIDE FUNGMETH & NONE
SED	0.280	0.280	0.396 0.343*

* FOR COMPARISONS INVOLVING NONE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.396	16.2

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED 0.00260

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79/R/B/9

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 - Claycroft.

Sponsors: J.F. Jenkyn, R.T. Plumb.

Design: Half replicate in 2 blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3.

Treatments: Combinations of:-

1. SOW DATE	Dates of sowing:	
	17 APR	17 April, 1979
	8 MAY	8 May
2. FUNGCIDE(1)	Fungicidal seed dressing:	
	NONE	None
	ETHIRIMO	Ethirimol
3. FUNGCIDE(2)	Foliar fungicide:	
	NONE	None
	TRIDEMOR	Tridemorph at 0.53 kg in 220 l on 18 June, 1979
4. APHICIDE(1)	Aphicide to seedbed:	
	NONE	None
	PHORATE	Phorate at 5.0 kg
5. APHICIDE(2)	Foliar aphicide:	
	NONE	None
	DIMETH	Dimethoate at 0.084 kg in 220 l on 5 June, 1979
6. APHICIDE(3)	Foliar aphicide:	
	NONE	None
	DIMETH	Dimethoate at 0.34 kg in 220 l on 11 July, 1979

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 2.1 kg) and mecoprop at 1.7 kg in 220 l.

Seed: Wing, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 31 Oct, 1978. Ploughed: 2 Nov. Spring-tine cultivated: 16 Apr, 1979. Early-sown plots power harrowed, seed sown: 17 Apr. Late-sown plots power harrowed, seed sown: 8 May. Weedkillers applied: 1 June. Early-sown plots combine harvested: 26 Aug. Late-sown plots combine harvested: 5 Sept. Previous cropping: Beans 1977, wheat 1978.

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79/R/B/9

NOTE: Seedling emergence, leaf diseases, numbers of grains per ear and plant populations were assessed.

GRAIN TONNES/HECTARE

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

FUNGCIDE(1)	NONE	ETHIRIMO	MEAN
SOW DATE			
17 APR	5.47	5.66	5.57
8 MAY	4.58	4.63	4.61
MEAN	5.02	5.15	5.09

FUNGCIDE(2)	NONE	TRIDEMOR	MEAN
SOW DATE			
17 APR	5.53	5.60	5.57
8 MAY	4.25	4.97	4.61
MEAN	4.89	5.28	5.09

FUNGCIDE(2)	NONE	TRIDEMOR	MEAN
FUNGCIDE(1)			
NONE	4.85	5.19	5.02
ETHIRIMO	4.93	5.37	5.15
MEAN	4.89	5.28	5.09

APHICIDE(1)	NONE	PHORATE	MEAN
SOW DATE			
17 APR	5.50	5.64	5.57
8 MAY	4.76	4.46	4.61
MEAN	5.13	5.05	5.09

APHICIDE(1)	NONE	PHORATE	MEAN
FUNGCIDE(1)			
NONE	4.91	5.14	5.02
ETHIRIMO	5.35	4.95	5.15
MEAN	5.13	5.05	5.09

APHICIDE(1)	NONE	PHORATE	MEAN
FUNGCIDE(2)			
NONE	4.93	4.85	4.89
TRIDEMOR	5.32	5.24	5.28
MEAN	5.13	5.05	5.09

APHICIDE(2)	NONE	DIMETH	MEAN
SOW DATE			
17 APR	5.65	5.48	5.57
8 MAY	4.71	4.50	4.61
MEAN	5.18	4.99	5.09

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79/R/B/9

GRAIN TONNES/HECTARE

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

APHICIDE(2)	NONE	DIMETH	MEAN
FUNGCIDE(1)			
NONE	5.18	4.87	5.02
ETHIRIMO	5.18	5.12	5.15
MEAN	5.18	4.99	5.09

APHICIDE(2)	NONE	DIMETH	MEAN
FUNGCIDE(2)			
NONE	5.01	4.77	4.89
TRIDEMOR	5.35	5.21	5.28
MEAN	5.18	4.99	5.09

APHICIDE(2)	NONE	DIMETH	MEAN
APHICIDE(1)			
NONE	5.33	4.93	5.13
PHORATE	5.04	5.05	5.05
MEAN	5.18	4.99	5.09

APHICIDE(3)	NONE	DIMETH	MEAN
SOW DATE			
17 APR	5.48	5.65	5.57
8 MAY	4.43	4.79	4.61
MEAN	4.95	5.22	5.09

APHICIDE(3)	NONE	DIMETH	MEAN
FUNGCIDE(1)			
NONE	4.90	5.15	5.02
ETHIRIMO	5.01	5.29	5.15
MEAN	4.95	5.22	5.09

APHICIDE(3)	NONE	DIMETH	MEAN
FUNGCIDE(2)			
NONE	4.78	5.00	4.89
TRIDEMOR	5.13	5.43	5.28
MEAN	4.95	5.22	5.09

APHICIDE(3)	NONE	DIMETH	MEAN
APHICIDE(1)			
NONE	5.09	5.17	5.13
PHORATE	4.82	5.27	5.05
MEAN	4.95	5.22	5.09

APHICIDE(3)	NONE	DIMETH	MEAN
APHICIDE(2)			
NONE	5.04	5.32	5.18
DIMETH	4.87	5.12	4.99
MEAN	4.95	5.22	5.09

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79/R/B/9

GRAIN TONNES/HECTARE

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

TABLE	SOW DATE	FUNGCIDE(1)	FUNGCIDE(2)	APHICIDE(1)
SED	0.151	0.151	0.151	0.151

TABLE	APHICIDE(2)	APHICIDE(3)	SOW DATE FUNGCIDE(1)	SOW DATE FUNGCIDE(2)
SED	0.151	0.151	0.214	0.214

TABLE	FUNGCIDE(1) FUNGCIDE(2)	SOW DATE APHICIDE(1)	FUNGCIDE(1) APHICIDE(1)	FUNGCIDE(2) APHICIDE(1)
SED	0.214	0.214	0.214	0.214

TABLE	SOW DATE APHICIDE(2)	FUNGCIDE(1) APHICIDE(2)	FUNGCIDE(2) APHICIDE(2)	APHICIDE(1) APHICIDE(2)
SED	0.214	0.214	0.214	0.214

TABLE	SOW DATE APHICIDE(3)	FUNGCIDE(1) APHICIDE(3)	FUNGCIDE(2) APHICIDE(3)	APHICIDE(1) APHICIDE(3)
SED	0.214	0.214	0.214	0.214

TABLE	APHICIDE(2) APHICIDE(3)
SED	0.214

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

STRATUM	DF	SE	CV%
WP	10	0.428	8.4

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00260

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79/R/B/10

SPRING BARLEY

MILDEW CONTROL IN A SERIALLY BALANCED DESIGN

Object: To study the effects of two fungicides and the effects of interference between plots on the incidence of mildew and on yield - Claycroft.

Sponsors: J.F. Jenkyn, G.V. Dyke.

Design: 9 'blocks' of 4 plots (+ 2 flanking plots).

Whole plot dimensions: 3.91 x 9.14.

Treatments:

FUNGCIDE	Fungicides:
NONE	None
TRIADIME	Triadimefon
TRIDEMOR	Tridemorph (duplicated)

NOTES: (1) Treatments were applied to 38 plots in one line on the field. The design was derived from a serially-balanced one for four treatments, in which each of the 36 possible sets of 3 adjacent treatments occur exactly once (but omitting sets with the same treatment on 2 successive plots), by equating 2 of the treatments. This results in 2 sets of 3 adjacent plots treated alike, 2 sets of 2. 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) Fungicides were applied on 18 June, 1979, tridemorph at 0.53 kg in 340 l, triadimefon at 0.13 kg in 340 l. The surrounding crop was sprayed with tridemorph at 0.53 kg in 220 l on the same date.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.5 kg in 220 l).

Seed: Julia, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 31 Oct, 1978. Ploughed: 2 Nov. Spring-tine cultivated: 16 Apr, 1979. Sown: 17 Apr. Weedkillers applied: 18 May. Harvested: 26 Aug. Previous crops: Beans and potatoes 1977, wheat 1978.

NOTE: Leaf diseases were assessed on two occasions. 1000 grain weights were measured.

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79/R/B/10

GRAIN TONNES/HECTARE

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

GRAND MEAN 6.54

FUNGCIDE	NONE	TRIADIME	TRIDEMOR
	6.48	6.62	6.52

LHN FUNGCIDE	NONE	TRIADIME	TRIDEMOR
NONE		6.49	6.47
TRIADIME	6.38		6.74
TRIDEMOR	6.50	6.49	6.57

RHN FUNGCIDE	NONE	TRIADIME	TRIDEMOR
NONE		6.57	6.43
TRIADIME	6.46		6.70
TRIDEMOR	6.46	6.45	6.65

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

TABLE	FUNGCIDE	FUNGCIDE LHN	FUNGCIDE RHN	
SED	0.111	0.205	0.204	MIN REP
	0.096	0.178	0.176	MAX-MIN
		0.145	0.144	MAX REP

MAX REP FOR COMPARISONS WHERE BOTH MEANS HAVE A LEVEL TRIDEMOR FOR ANY FACTOR
MIN REP FOR COMPARISONS WHERE BOTH MEANS DO NOT HAVE A LEVEL TRIDEMOR FOR ANY FACTOR
MAX-MIN FOR ANY COMPARISONS NOT COVERED ABOVE

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

STRATUM	DF	SE	CV%
WP	21	0.234	3.6

GRAIN MEAN DM% 80.9

PLOT AREA HARVESTED 0.00195

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79/R/B/11

SPRING BARLEY

CONTROLLED DROP APPLICATION OF TRIDEMORPH

Object: To compare controlled drop application with conventional spraying on the deposition of spray material, control of mildew and on the yield of spring barley - Claycroft.

Sponsors: F.T. Phillips, A.J. Arnold, P. Etheridge.

Design: 3 randomised blocks of 11 plots.

Whole plot dimensions: 4.27 x 24.4.

Treatments: All combinations of:-

1. SPRAYER	Sprayer and drop density:
CDA 1	Controlled drop application sprayer, standard drop density
CDA 2	Controlled drop application sprayer, twice standard drop density
HYDRAUL	Hydraulic sprayer
2. TRI RATE	Rates of applying tridemorph (on 12 June, 1979):
1	Standard, 525 g
1/2	Half standard, 263 g
1/4	Quarter standard, 132 g
EXTRA	plus two extra plots
NONE	Unsprayed
CDA R 1	Controlled drop application sprayer, reduced drop density, applying standard rate tridemorph

NOTES: (1) CDA sprayer applied tridemorph in 19 l.
(2) Hydraulic sprayer applied tridemorph in 340 l.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Bromoxynil with ioxynil (as 'Oxytril CM' at 2.1 kg) and mecoprop at 1.6 kg in 220 l.

Seed: Wing, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 31 Oct, 1978. Ploughed: 2 Nov. Spring-tine cultivated: 16 Apr, 1979. Seed sown: 17 Apr. Weedkillers applied: 1 June. Combine harvested: 26 Aug. Previous crops: Beans 1977, wheat 1978.

NOTE: Observations were made on patterns of spray deposition using very small quantities of permethrin as a chemical marker.

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79/R/B/11

GRAIN TONNES/HECTARE

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

TRI RATE / SPRAYER	1	1/2	1/4	MEAN
CDA 1	6.14	6.11	5.69	5.98
CDA 2	5.75	6.21	5.89	5.95
HYDRAUL	6.01	5.94	6.05	6.00
MEAN	5.96	6.09	5.88	5.98

EXTRA	NONE	CDA R 1	MEAN
	5.63	6.16	5.89

GRAND MEAN 5.96

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

TABLE	SPRAYER	TRI RATE	SPRAYER TRI RATE & EXTRA
SED	0.144	0.144	0.249

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.305	5.1

GRAIN MEAN DM% 81.5

PLOT AREA HARVESTED 0.00520

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79/R/B/12

SPRING BARLEY

N AND MILDEW

Object: To study the effects of mildew on response to a range of nitrogen rates - Geescroft.

Sponsors: J.F. Jenkyn, M.E. Finney.

Design: 3 randomised blocks of 6 plots split into 2.

Whole plot dimensions: 4.27 x 19.2.

Treatments: All combinations of:-

Whole plots

1. N Amounts of nitrogen fertiliser (kg N):

25
50
70
90
110
135

Sub plots

2. MILDEW F Mildew fungicide:

NONE None
TRIDEMOR Tridemorph on 18 June

NOTES: (1) Tridemorph was applied at 0.53 kg in 340 l.
(2) Sides of plots were separated by a strip of Magnum barley 2.13 m wide sown at 160 kg. Seed was dressed with ethirimol and combine drilled with (20:14:14) at 440 kg.
(3) 25 kg N was applied to all treatments as the basal (20:14:14) at drilling. The remaining N was broadcast by drill as 'Nitro-Chalk' on 17 May.

Basal applications: Manures: (20:14:14) at 125 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 4.9 kg in 220 l).

Seed: Zephyr, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 7 Nov, 1978. Ploughed: 13 Nov. Spring-tine cultivated: 18 Apr, 1979. Seed sown: 19 Apr. Weedkillers applied: 1 June. Combine harvested: 28 Aug. Previous crops: Beans 1977, wheat 1978.

NOTE: Crop samples were taken periodically and nitrogen contents measured. Leaf diseases were assessed on three occasions. Counts were made of numbers of plants, ears, grains per ear. 1000 grain weights were measured.

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79/R/B/12

GRAIN TONNES/HECTARE

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

MILDEW F N	NONE	TRIDEMOR	MEAN
25	3.81	4.21	4.01
50	4.67	4.97	4.82
70	4.64	5.80	5.22
90	5.52	6.10	5.81
110	5.55	6.09	5.82
135	5.42	6.12	5.77
MEAN	4.94	5.55	5.24

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

TABLE	N	MILDEW F	N MILDEW F
SED	0.131	0.105	0.224
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N			0.257

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.161	3.1
BLOCK.WP.SP	12	0.314	6.0

GRAIN MEAN DM% 81.9

SUB PLOT AREA HARVESTED 0.00195

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79/R/B/13

SPRING BARLEY

MIXED VARIETIES AND MILDEW

Object: To study the effects of variety mixtures and of fungicides on mildew development and yield - Gt. Field I.

Sponsor: J.F. Jenkyn.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 9.14.

Treatments:

VAR FUNG	Varieties & fungicides:
H 0	Hassan, no fungicide
M 0	Midas, no fungicide
W 0	Wing, no fungicide
H S	Hassan, seed treated fungicide
M S	Midas, seed treated fungicide
W S	Wing, seed treated fungicide
H0 M0 W0	Mixture of the three varieties, no fungicide
HS M0 W0	Mixture of the three varieties. Fungicide seed treatment to Hassan only
H0 MS W0	Mixture of the three varieties. Fungicide seed treatment to Midas only
H0 M0 WS	Mixture of the three varieties. Fungicide seed treatment to Wing only
HS MS WS	Mixture of the three varieties. Fungicide seed treatment to all
HF MF WF	Mixture of the three varieties. Tridemorph foliar spray to all (Tridemorph at 0.53 kg in 340 l on 18 June)

NOTES: (1) All plots were separated at their sides by 8.5 m of variety Proctor and at their ends by 9.1 m of variety Proctor. All the Proctor seed was dressed with ethirimol and the crop was sprayed with tridemorph at 0.53 kg in 220 l on 18 June, 1979. Yields were taken from the Proctor adjacent to the sides of plots and treatment yields were adjusted by covariance analysis.

(2) The fungicide seed treatment applied was 0.375 g triadimenol plus 0.045 g fuberidazole per kg of seed.

(3) The seed mixtures were in equal proportions by weight.

Basal applications: Manures: (20:14:14) at 440 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 4.9 kg in 220 l).

Seed: All, including mixtures and Proctor, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 10 Nov, 1978. Ploughed: 30 Nov. Spring-tine cultivated: 17 Apr, 1979. Seed sown: 18 Apr. Weedkillers applied: 4 June. Combine harvested: 25 Aug. Previous crops: Beans 1977, wheat 1978.

NOTE: Mildew was assessed on two occasions.

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79/R/B/13

GRAIN TONNES/HECTARE

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

VAR FUNG	
H O	4.58
M O	5.84
W O	5.46
H S	5.85
M S	6.04
W S	5.82
HO MO WO	5.14
HS MO WO	5.77
HO MS WO	5.57
HO MO WS	5.82
HS MS WS	5.65
HF MF WF	5.87
MEAN	5.62

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

TABLE	VAR FUNG
SED	0.335

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

STRATUM	DF	SE	CV%
BLOCK.WP	32	0.466	8.3

GRAIN MEAN DM% 80.6

PLOT AREA HARVESTED 0.00195

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79/R/B/21

SPRING BARLEY

DRILLS AND METHODS OF APPLYING FERTILISER

Object: To study the effects of different drills and rates and times of applying nitrogen fertiliser on the growth and yield of barley - Bylands.

Sponsor: R. Moffitt.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions:

DRILLS MF	5.33 x 10.1
DRILLS NIAE	4.27 x 10.1
EXTRA	3.05 x 10.1

Treatments: All combinations of:-

1. DRILLS — Drills:

MF	'Massey Ferguson 30' drill, sowing rows 18 cm (7 in) apart
NIAE	'NIAE' drill, sowing rows 18 cm (7 in) apart

2. TOTAL N — Total nitrogen fertiliser (kg N):

60
120

3. N METHOD — Method of applying nitrogen fertiliser:

CDE	Combine drilled at sowing
BCL	Broadcast by machine 17 days after sowing
CDE/BCL	Half total combine drilled, half broadcast by machine 17 days after sowing

plus four extra treatments

EXTRA

F60 BCE	'Fiona' drill, sowing rows 15 cm (6 in) apart, 60 kg N broadcast by machine at sowing
F120 BCE	As previously but using 120 kg N
F60 BCL	'Fiona' drill, 60 kg N broadcast by machine 17 days after sowing
F120 BCL	As previously but using 120 kg N

Basal applications: Weedkillers: Bromoxynil and ioxynil (as 'Oxytril CM' at 1.4 kg) with mecoprop at 1.7 kg in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l.

Seed: Porthos, sown at 160 kg.

Cultivations, etc.:- Subsoiled, tines 100 cm apart and 45 cm deep: 15 Nov, 1978. Ploughed: 21 Dec. Heavy spring-tine cultivated, rotary harrowed: 27 Apr, 1979. Seed sown: 30 Apr. Weedkillers applied: 4 June. Fungicide applied: 12 June. Combine harvested: 29 Aug. Previous crops: Wheat 1977, barley 1978.

NOTES: (1) Observations of growth stages, evenness of growth and wheeling effects were made several times during the season.
(2) Severe grazing by rabbits, and infestations of perennial grasses may have affected yield.

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79/R/B/21

GRAIN TONNES/HECTARE

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

TOTAL N / DRILLS	60	120	MEAN
MF	2.85	3.36	3.10
NIAE	2.89	2.76	2.82
MEAN	2.87	3.06	2.96

N METHOD / DRILLS	CDE	BCL	CDE/BCL	MEAN
MF	3.46	2.91	2.94	3.10
NIAE	2.68	2.70	3.08	2.82
MEAN	3.07	2.81	3.01	2.96

N METHOD / TOTAL N	CDE	BCL	CDE/BCL	MEAN
60	3.03	2.63	2.95	2.87
120	3.12	2.98	3.07	3.06
MEAN	3.07	2.81	3.01	2.96

DRILLS	N METHOD / TOTAL N	CDE	BCL	CDE/BCL
MF	60	3.32	2.72	2.52
	120	3.61	3.11	3.35
NIAE	60	2.74	2.55	3.38
	120	2.63	2.86	2.79

EXTRA	F60 BCE	F120 BCE	F60 BCL	F120 BCL	MEAN
	2.66	3.14	2.48	3.21	2.87

GRAND MEAN 2.94

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

TABLE	EXTRA	DRILLS	TOTAL N	N METHOD
SED	0.296	0.121	0.121	0.148

TABLE	DRILLS TOTAL N	DRILLS N METHOD	TOTAL N N METHOD	DRILLS TOTAL N N METHOD & EXTRA
SED	0.171	0.209	0.209	0.296

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

STRATUM	DF	SE	CV%
BLOCK.WP	30	0.363	12.3

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00215

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79/R/BE/1

WINTER BEANS

CONTROL OF CHOCOLATE SPOT

Object: To study the effects of irrigation and benomyl on Chocolate Spot (Botrytis spp.) and yield of winter beans - Fosters West.

Sponsors: A. Bainbridge, M.E. Finney.

Design: 3 blocks of 2 whole plots split into 4.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

Whole plots

1. IRRIGATN	Irrigation:
NONE	None
APPLIED	Applied (50 mm)

Sub plots

2. BENOMYL	Frequency of applying benomyl (at 1.1 kg in 340 l on each occasion):-
0+0	Never
1+0	Once, on 25 May, 1979
1+1	Twice, on 25 May and 29 June (duplicated)

NOTES: (1) IRRIGATN APPLIED plots were given 12.5 mm of irrigation on each of the following dates: 2 July, 11 July, 16 July, 22 July.
(2) On one of the duplicates of 1+1 the first treatment was not applied until 30 May because the sprayer broke down.

Basal applications: Weedkiller: Simazine at 1.1 kg in 220 l. Aphicide: Pirimicarb at 0.14 kg in 220 l. Desiccant: Diquat at 0.59 kg ion with 'Agral' (a wetting agent) at 0.21 kg in 220 l.

Seed: Throws MS, sown at 250 kg.

Cultivations, etc.:- Ploughed: 24 Aug, 1978. Spring-tine cultivated: 2 Oct. Rotary harrowed, seed sown, weedkiller applied: 9 Oct. Tractor hoed: 11 June. Aphicide applied: 25 June. Desiccant applied: 4 Sept. Combine harvested: 7 Sept. Previous cropping: Wheat 1977, barley 1978.

NOTE: Counts were made of seedling emergence, percentage leaf area affected by Botrytis spp., stems per row, pods per stem and 1000 grain weights.

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79/R/BE/1

GRAIN TONNES/HECTARE

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

BENOMYL IRRIGATN	0+0	1+0	1+1	MEAN
NONE	3.03	3.34	3.40	3.29
APPLIED	4.26	4.05	4.37	4.26
MEAN	3.65	3.69	3.88	3.78

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

TABLE	BENOMYL	IRRIGATN* BENOMYL	
SED	0.244	0.345	MIN REP
	0.211	0.299	MAX-MIN

	BENOMYL
MAX-MIN	1+1 V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

* WITHIN THE SAME LEVEL OF IRRIGATN ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	14	0.423	11.2

GRAIN MEAN DM% 79.8

SUB PLOT AREA HARVESTED 0.00293

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79/R/BE/2

WINTER BEANS

CONTROL OF SITONA

Object: To study the effects of three chemicals on the control of Sitona larvae and on the yield of winter beans - Fosters West.

Sponsors: R. Bardner, K.E. Fletcher, D.C. Griffiths.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 5.33 x 13.7.

Treatments:

CHEMICAL	Chemicals and times of application:
NONE	None (duplicated)
ALDICARB	Aldicarb at 5 kg applied to the seedbed on 5 Oct, 1978
FONOFOS	Fonofos at 5 kg applied to the seedbed
PERMETH	Permethrin applied as foliar spray in 340 l on 2 May, 1979 and 30 May
ALD+PER	Aldicarb to seedbed plus permethrin as foliar spray at above rates and times

NOTE: Permethrin was applied on the first occasion at 0.2 kg in 200 l and on the second occasion at 0.15 kg in 340 l.

Basal applications: Weedkillers: Simazine at 1.1 kg in 220 l. Aphicide: Pirimicarb at 0.14 kg in 220 l. Desiccant: Diquat at 0.59 kg ion with 'Agral' (a wetting agent) at 0.21 kg in 220 l.

Seed: Throws MS, sown at 250 kg.

Cultivations, etc.:- Ploughed: 24 Aug, 1978. Spring-tine cultivated twice: 2 Oct and 6 Oct. Rotary harrowed, seed sown, weedkiller applied: 9 Oct. Tractor-hoed: 11 June, 1979. Aphicide applied: 25 June. Desiccant applied: 4 Sept. Combine harvested: 7 Sept. Previous cropping: Wheat 1977, barley 1978.

NOTE: Incidence of ground beetles was assessed in April. Numbers of plants and stems per plant were counted. Leaf notching by adult Sitona lineatus was assessed several times during the season, and soil cores were examined for larval populations in June.

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79/R/BE/2

GRAIN TONNES/HECTARE

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

CHEMICAL	NONE	ALDICARB	FONOFOS	PERMETH	ALD+PER	MEAN
	3.47	3.20	3.70	4.00	3.77	3.60

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

TABLE	CHEMICAL	
SED	0.226	MIN REP
	0.196	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	16	0.320	8.9

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00293

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79/R/BE/5

SPRING BEANS

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on pests, diseases, nitrogen fixation and yield of field beans - Little Hoos.

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, D.P. Yeoman, J.F. Witty.

Design: Single replicate of 2^6 in 2 blocks of 2 plots split into 4 sub plots, split into 4 sub sub plots.

Whole plot dimensions: 22.6 x 10.5.

Treatments: All combinations of:-

Whole plots

1. IRRIGATN — Irrigation:

   NONE — None
   FULL — Full (total 100 mm)

Sub plots

2. VARIETY — Varieties:

   BLAZE
   MINDEN

3. AL TRIS — Aluminium tris-ethyl phosphonate (kg) foliar spray on 14 June:

   0.0
   2.0

Sub sub plots

4. ALDICARB — Aldicarb to seedbed (kg) on 1 May:

   0
   10

5. PERMETH — Permethrin foliar spray (kg) on 18 June:

   0.00
   0.15

6. BENOMYL — Benomyl foliar spray (kg) on 15 Aug:

   0.0
   0.6

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NOTES: (1) A planned test of benomyl + thiram seed dressing failed because of seed-flow problems with the dressed seed, this treatment was replaced by AL TRIS.
(2) A planned test of conventional sowing versus precision sowing was abandoned because of extremely poor establishment with conventional sowing. All treatments presented were precision sown.
(3) A planned test of pirimicarb applied early was abandoned because of late sowing and the need to apply basal pirimicarb twice to control Aphis fabae.
(4) Irrigation was applied to reduce a deficit of 50 mm to 25 mm before pod set, and one of 80 mm to 55 mm after pod set (mm water):

2 July	25
6 July	25
10 July	25
23 July	25
Total	100

Basal applications: Weedkillers: Trietazine and simazine (as 'Remtal SC' at 2.8 kg) in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l applied twice.

Seed: Sown at 500,000 seeds per hectare in rows 20 cm apart. For Blaze 230 kg seed, for Minden 260 kg.

Cultivations, etc.:- Ploughed: 13 Dec, 1978. Heavy spring-tine cultivated: 21 Apr, 1979. Rotary harrowed: 1 May. Seed sown: 9 May. Weedkillers applied: 14 May. Insecticide applied: 22 June and 13 July. Combine harvested: 16 Oct. Previous cropping: Wheat 1977 and 1978.

NOTE: Plant counts were made after establishment and components of yield measured before harvest. Nitrogenase activity was measured during the season. Ectoparasitic nematodes, root and foliar fungi, aphids, weevils and viruses were counted at intervals during the season. Nitrogen percentages of grain were measured.

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79/R/BE/5

GRAIN TONNES/HECTARE

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

VARIETY	BLAZE	MINDEN	MEAN
IRRIGATN			
NONE	3.98	3.92	3.95
FULL	5.00	5.21	5.11
MEAN	4.49	4.56	4.53

AL TRIS	0.0	2.0	MEAN
IRRIGATN			
NONE	3.84	4.05	3.95
FULL	5.08	5.13	5.11
MEAN	4.46	4.59	4.53

AL TRIS	0.0	2.0	MEAN
VARIETY			
BLAZE	4.42	4.56	4.49
MINDEN	4.50	4.62	4.56
MEAN	4.46	4.59	4.53

ALDICARB	0	10	MEAN
IRRIGATN			
NONE	3.88	4.02	3.95
FULL	5.11	5.10	5.11
MEAN	4.50	4.56	4.53

ALDICARB	0	10	MEAN
VARIETY			
BLAZE	4.42	4.56	4.49
MINDEN	4.57	4.56	4.56
MEAN	4.50	4.56	4.53

ALDICARB	0	10	MEAN
AL TRIS			
0.0	4.44	4.49	4.46
2.0	4.55	4.63	4.59
MEAN	4.50	4.56	4.53

PERMETH	0.00	0.15	MEAN
IRRIGATN			
NONE	4.05	3.85	3.95
FULL	5.08	5.14	5.11
MEAN	4.56	4.49	4.53

PERMETH	0.00	0.15	MEAN
VARIETY			
BLAZE	4.51	4.47	4.49
MINDEN	4.61	4.52	4.56
MEAN	4.56	4.49	4.53

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GRAIN TONNES/HECTARE

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

PERMETH AL TRIS	0.00	0.15	MEAN
0.0	4.52	4.41	4.46
2.0	4.60	4.58	4.59
MEAN	4.56	4.49	4.53

PERMETH ALDICARB	0.00	0.15	MEAN
0	4.56	4.43	4.50
10	4.56	4.56	4.56
MEAN	4.56	4.49	4.53

BENOMYL IRRIGATN	0.0	0.6	MEAN
NONE	3.85	4.05	3.95
FULL	5.00	5.21	5.11
MEAN	4.43	4.63	4.53

BENOMYL VARIETY	0.0	0.6	MEAN
BLAZE	4.33	4.65	4.49
MINDEN	4.52	4.60	4.56
MEAN	4.43	4.63	4.53

BENOMYL AL TRIS	0.0	0.6	MEAN
0.0	4.34	4.59	4.46
2.0	4.51	4.67	4.59
MEAN	4.43	4.63	4.53

BENOMYL ALDICARB	0.0	0.6	MEAN
0	4.45	4.54	4.50
10	4.40	4.72	4.56
MEAN	4.43	4.63	4.53

BENOMYL PERMETH	0.0	0.6	MEAN
0.00	4.43	4.69	4.56
0.15	4.42	4.56	4.49
MEAN	4.43	4.63	4.53

VARIETY	BLAZE		MINDEN	
ALDICARB	0	10	0	10
IRRIGATN				
NONE	3.86	4.10	3.90	3.94
FULL	4.99	5.02	5.24	5.18

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GRAIN TONNES/HECTARE

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

AL TRIS	0.0		2.0	
ALDICARB	0	10	0	10
IRRIGATN				
NONE	3.71	3.98	4.05	4.06
FULL	5.17	5.00	5.06	5.20

AL TRIS	0.0		2.0	
ALDICARB	0	10	0	10
VARIETY				
BLAZE	4.41	4.43	4.44	4.68
MINDEN	4.46	4.55	4.67	4.57

VARIETY	BLAZE		MINDEN	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	4.05	3.90	4.04	3.80
FULL	4.97	5.04	5.19	5.24

AL TRIS	0.0		2.0	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	4.01	3.67	4.08	4.02
FULL	5.03	5.14	5.12	5.13

AL TRIS	0.0		2.0	
PERMETH	0.00	0.15	0.00	0.15
VARIETY				
BLAZE	4.40	4.44	4.62	4.50
MINDEN	4.64	4.37	4.59	4.66

ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	3.99	3.77	4.11	3.93
FULL	5.14	5.09	5.01	5.18

ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
VARIETY				
BLAZE	4.50	4.35	4.52	4.59
MINDEN	4.63	4.51	4.60	4.52

ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
AL TRIS				
0.0	4.55	4.33	4.49	4.48
2.0	4.58	4.53	4.63	4.63

VARIETY	BLAZE		MINDEN	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.84	4.12	3.86	3.98
FULL	4.82	5.19	5.19	5.23

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GRAIN TONNES/HECTARE

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

AL TRIS	0.0		2.0	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.70	3.99	4.00	4.11
FULL	4.98	5.19	5.03	5.23
AL TRIS	0.0		2.0	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.24	4.60	4.41	4.70
MINDEN	4.44	4.57	4.61	4.64
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.80	3.95	3.89	4.15
FULL	5.10	5.13	4.91	5.29
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.35	4.50	4.30	4.81
MINDEN	4.55	4.58	4.50	4.62
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
AL TRIS				
0.0	4.39	4.49	4.29	4.68
2.0	4.52	4.59	4.51	4.75
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.93	4.17	3.77	3.93
FULL	4.93	5.22	5.08	5.19
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.29	4.73	4.37	4.57
MINDEN	4.57	4.66	4.48	4.55
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
AL TRIS				
0.0	4.32	4.72	4.36	4.45
2.0	4.54	4.67	4.48	4.67
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
ALDICARB				
0	4.51	4.62	4.39	4.46
10	4.35	4.77	4.45	4.66

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GRAIN TONNES/HECTARE

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

VARIETY	BLAZE		MINDEN	
AL TRIS	0.0	2.0	0.0	2.0
IRRIGATN				
NONE	3.80	4.16	3.88	3.95
FULL	5.04	4.96	5.12	5.30

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

TABLE	ALDICARB	PERMETH	BENOMYL	IRRIGATN* ALDICARB
SED	0.046	0.046	0.046	0.065

TABLE	VARIETY* ALDICARB	AL TRIS* ALDICARB	IRRIGATN* PERMETH	VARIETY* PERMETH
SED	0.065	0.065	0.065	0.065

TABLE	AL TRIS* PERMETH	ALDICARB PERMETH	IRRIGATN* BENOMYL	VARIETY* BENOMYL
SED	0.065	0.065	0.065	0.065

TABLE	AL TRIS* BENOMYL	ALDICARB BENOMYL	PERMETH+ BENOMYL	IRRIGATN* AL TRIS* ALDICARB
SED	0.065	0.065	0.065	0.092

TABLE	VARIETY* AL TRIS* ALDICARB	IRRIGATN* VARIETY* PERMETH	IRRIGATN* AL TRIS* PERMETH	VARIETY* AL TRIS* PERMETH
SED	0.092	0.092	0.092	0.092

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GRAIN TONNES/HECTARE

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

TABLE	IRRIGATN* ALDICARB PERMETH	VARIETY* ALDICARB PERMETH	AL TRIS* ALDICARB PERMETH	IRRIGATN* VARIETY* BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	IRRIGATN* AL TRIS* BENOMYL	VARIETY* AL TRIS* BENOMYL	IRRIGATN* ALDICARB BENOMYL	VARIETY* ALDICARB BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	AL TRIS* ALDICARB BENOMYL	IRRIGATN* PERMETH BENOMYL	VARIETY* PERMETH BENOMYL	ALDICARB* PERMETH BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	IRRIGATN* VARIETY* ALDICARB
SED	0.092

* SED ONLY VALID FOR COMPARING MEANS WITH THE SAME LEVELS (COMBINATIONS) OF THE FACTORS MARKED WITH *
+ SED NOT VALID FOR COMPARING MEANS WITH THE SAME LEVELS OF PERMETH OR BENOMYL

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP.SSP	18	0.185	4.1

GRAIN MEAN DM% 73.4

SUB PLOT AREA HARVESTED 0.00248

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79/R/BE/6

SPRING BEANS

N AND PATHOGEN CONTROL

Object: To study the effect of enhanced pathogen control on the proportion of nitrogen in the crop derived from the soil, from fertiliser and from nitrogen-fixation. The study was aided by using 15 N-labelled fertilisers and spring barley as a crop which did not fix nitrogen - Little Hoos.

Sponsors: J.M. Day, R.J. Roughley, J.F. Witty.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: Beans: 3.25 x 4.57, barley 2.13 x 4.57.

Treatments: All combinations of:-

1. PATHCONT — Pathogen control:

   STANDARD — Standard, pirimicarb foliar spray only
   ENHANCED — Aldicarb at 10 kg to seedbed plus pirimicarb foliar spray

2. BEANS N — Nitrogen fertiliser (kg N) to beans:

   0
   50
   100
   150

plus four extra treatments sown to spring barley and given rates of nitrogen fertiliser (kg N):

BARLEY N

0
50
100
150

Standard applications: Barley: Manures: (0:20:20) at 310 kg, combine drilled.
Beans: Insecticide: Pirimicarb at 0.14 kg in 340 l.

Seed: Barley: Porthos, sown at 160 kg.
Beans: Minden, sown at 260 kg.

Cultivations, etc.:- Ploughed: 13 Dec, 1978. Heavy spring-tine cultivated: 21 Apr, 1979. Aldicarb applied, rotary harrowed: 1 May. Barley sown: 3 May. Beans sown: 9 May. Insecticide applied: 12 July. Barley hand harvested: 7 Sept. Beans hand harvested: 24 Sept. Previous cropping: Wheat 1977 and 1978.

NOTES: (1) Content of 15N was assessed in whole plants shortly before harvest.
(2) Nitrogen percentages of grain were measured.

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79/R/BE/6

BEANS

GRAIN TONNES/HECTARE

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

BEANS N / PATHCONT	0	50	100	150	MEAN
STANDARD	4.05	4.10	4.25	4.13	4.13
ENHANCED	5.33	5.38	5.86	5.75	5.58
MEAN	4.69	4.74	5.05	4.94	4.86

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

TABLE	PATHCONT	BEANS N	PATHCONT BEANS N
SED	0.131	0.185	0.261

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

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.369	7.6

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00074

BARLEY

GRAIN TONNES/HECTARE

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

BARLEY N	0	50	100	150	MEAN
	3.48	4.00	4.93	4.72	4.28

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

TABLE	BARLEY N
SED	0.297

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.420	9.8

GRAIN MEAN DM% 94.0

PLOT AREA HARVESTED 0.00049

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79/R/BE/8

SPRING BEANS

FOLIAR NUTRITION

Object: To study the effects of a range of foliar-applied nutrients on the yield and nitrogen uptake of spring beans - Summerdells II.

Sponsors: J.M. Day, R.J. Roughley, J.F. Witty.

Design: 4 randomised blocks of 15 plots.

Whole plot dimensions: 2.66 x 3.66.

Treatments: All combinations of:-

1. NUT FORM — Form of nutrients:

AP U K	Ammonium polyphosphate + urea + potassium sulphate
AHP U K	Ammonium hydrogen phosphate + urea + potassium sulphate
AHP - K	Ammonium hydrogen phosphate + potassium sulphate (but see NOTE)
PP U K	Potassium polyphosphate + urea + potassium sulphate
PP - K	Potassium polyphosphate + potassium sulphate
U	Urea

2. NUT FREQ — Frequency of applying nutrients:

2	Twice 13 July, 1979 and 20 July
4	Four times 13 July, 1979, 20 July, 27 July and 3 Aug

plus two extra treatments:

EXTRA	
-	None (duplicated)
K 4	Potassium sulphate applied four times

NOTE: It was intended that each treatment containing nitrogen should supply about 20 kg N per occasion. The first spray of AHP - K scorched the leaves. The problem with this treatment was overcome by including urea in later sprays to maintain the rate of nitrogen but lessen the amount of ammonium hydrogen phosphate.

Rates of nutrients (kg element) applied on each spray occasion:

	N		P	K		S
	in urea	in phosphates		in sulphate	in phosphate	
AP U K	20	1.6	4.3	7.5	-	3.0
AHP U K	20	3.6	5.5	7.5	-	3.0
AHP - K (1)	-	20	30.4	7.5	-	3.0
AHP - K (2,3 & 4)	15	5	5.5	7.5	-	3.0
PP U K	20	-	20	1.1	9.9	0.5
PP - K	-	-	20	1.1	9.9	0.5
U	20	-	-	-	-	-
-	-	-	-	-	-	-
K 4	-	-	-	7.5	-	3.0

Treatments were applied in 536 l.

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79/R/BE/8

Basal applications: Manures: Chalk at 7.5 t. FYM at 35 t. Weedkiller: Simazine at 0.82 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 26 Oct, 1978. FYM applied: 14 Nov. Ploughed: 23 Nov. Heavy spring-tine cultivated: 19 Apr, 1979. Rotary harrowed: 20 Apr. Seed sown: 21 Apr. Weedkiller applied: 15 May. Insecticide applied: 22 June. Harvested by hand: 17 Sept. Previous crops: Spring wheat, 1977, barley 1978.

NOTES: (1) Content of 15N (added to certain of the treatments) was assessed in whole plants shortly before harvest.
(2) Nitrogen percentages of grain were measured.

GRAIN TONNES/HECTARE

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

NUT FREQ / NUT FORM	2	4	MEAN
AP U K	4.11	4.20	4.15
AHP U K	4.06	3.90	3.98
AHP - K	3.65	4.00	3.82
PP U K	3.92	4.27	4.09
PP -K	4.19	4.47	4.33
U	4.34	4.17	4.26
MEAN	4.04	4.17	4.11

EXTRA	-	K4	MEAN
	4.49	4.55	4.51

GRAND MEAN 4.19

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

TABLE	EXTRA	NUT FORM	NUT FREQ	NUT FORM NUT FREQ & EXTRA
SED	0.214	0.175	0.101	0.247 0.214*

* USE ONLY FOR COMPARISONS BETWEEN NUT FORM.NUT FREQ AND LEVEL - OF EXTRA

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

STRATUM	DF	SE	CV%
BLOCK.WP	43	0.350	8.4

GRAIN MEAN DM% NOT AVAILABLE

PLOT AREA HARVESTED 0.00112

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79/R/BE/9

SPRING BEANS

CONTROL OF SITONA

Object: To study the effects of a range of insecticidal treatments on the incidence of Sitona larvae and on the yield of beans - Summerdells II.

Sponsors: R. Bardner, D.C. Griffiths, K.E. Fletcher.

Design: 4 blocks of 6 plots.

Whole plot dimensions: 5.33 x 9.14.

Treatments:

INSCTCDE	Insecticides and methods of application:
NONE	None
ALD SOIL	Aldicarb at 10 kg worked into soil before sowing
CAR FURR	Carbofuran at 2.24 kg applied in the seed furrow at sowing by combine drill
PHO SEED	Phorate applied as a seed dressing at 3 g kg^{-1} seed
PHO FURR	Phorate at 2.24 kg applied in the seed furrow at sowing by combine drill
PER LEAF	Permethrin foliar spray applied at 0.15 kg in 340 l on 18 May, 1979

Basal applications: Manures: Chalk at 7.5 t. FYM at 35 t. Weedkiller: Simazine at 0.84 kg in 220 l. Aphicide: Pirimicarb at 0.14 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 26 Oct, 1978. FYM applied: 14 Nov. Ploughed: 23 Nov. Heavy spring-tine cultivated: 19 Apr, 1979. Rotary harrowed: 20 Apr. Seed sown: 21 Apr. Weedkiller applied: 15 May. Aphicide applied: 22 June. Combine harvested: 21 Sept. Previous cropping: Barley 1977 & 1978.

NOTE: Leaf notching by adult Sitona lineatus was assessed in June, July and August; soil cores were examined for larval populations in July. Incidence of Aphis fabae was assessed in June.

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	ALD SOIL	CAR FURR	PHO SEED	PHO FURR	PER LEAF	MEAN
	4.16	4.89	4.61	4.16	4.40	4.44	4.44

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

TABLE	INSCTCDE
SED	0.165

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.233	5.2

GRAIN MEAN DM% 80.3 PLOT AREA HARVESTED 0.00293

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79/R/BE/10

SPRING BEANS

TIMES OF APPLYING PERMETHRIN

Object: To study the effects of applying foliar sprays of permethrin at a range of dates on the incidence of Sitona and on the yield of spring beans - Summerdells II.

Sponsors: R. Bardner, D.C. Griffiths, K.E. Fletcher.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 5.33 x 9.14.

Treatments:

PER DATE	Dates of applying permethrin (at 150 g on each occasion):
-	Not applied
18 MAY	Single spray on 18 May
18 JUNE	Single spray on 18 June
2 JULY	Single spray on 2 July
MA JN JL	Sprayed on all three above dates

NOTE: Permethrin was applied in 340 l.

Basal applications: Manures: Chalk at 7.5 t. FYM at 35 t. Weedkiller: Simazine at 0.84 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 26 Oct, 1978. FYM applied: 14 Nov. Ploughed: 23 Nov. Heavy spring-tine cultivated: 19 Apr, 1979. Rotary harrowed: 20 Apr. Seed sown: 21 Apr. Weedkiller applied: 15 May. Basal insecticide applied: 22 June. Combine harvested: 21 Sept. Previous cropping: Spring wheat 1977, barley 1978.

NOTES: (1) On 2 July part of one of the 18 JUNE plots was sprayed with permethrin in error. An estimated value was used in the analysis.
(2) After each treatment plots were assessed for leaf notches. In June ground beetles were trapped and leaf samples were taken for permethrin decomposition measurements. In July the incidence of Sitona larvae was estimated from soil cores and in August adult populations were estimated by trapping.

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79/R/BE/10

GRAIN TONNES/HECTARE

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

PER DATE	-	18 MAY	18 JUNE	2 JULY	MA JN JL	MEAN
	4.14	3.81	4.05	3.95	4.25	4.04

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

TABLE	PER DATE
SED	0.259

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.366	9.1

GRAIN MEAN DM% 80.0

PLOT AREA HARVESTED 0.00293

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79/R/BE/11

SPRING BEANS

PYRETHROIDS AND SITONA

Object: To study the effects of four pyrethroid insecticides, applied as foliar sprays, on the incidence of Sitona and on the yield of spring beans - Summerdells II.

Sponsors: D.C. Griffiths, R. Bardner, K.E. Fletcher.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 5.33 x 9.14.

Treatments:

PYRETH	Pyrethroids, applied in 340 l:
NONE	None
CYPERMET	Cypermethrin at 0.06 kg on 28 May, 1979
DECAMETH	Decamethrin at 0.03 kg on 28 May
FENVALER	Fenvalerate at 0.06 kg on 28 May
PERMETH	Permethrin at 0.15 kg on 18 May

Basal applications: Manures: Chalk at 7.5 t. FYM at 35 t. Weedkiller: Simazine at 0.84 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 26 Oct, 1978. FYM applied: 14 Nov. Ploughed: 23 Nov. Heavy spring-tine cultivated: 19 Apr, 1979. Rotary harrowed: 20 Apr. Seed sown: 21 Apr. Weedkiller applied: 15 May. Basal insecticide applied: 22 June. Combine harvested: 21 Sept. Previous cropping: Spring wheat 1977, barley 1978.

NOTE: Leaf notching by adult Sitona lineatus was assessed in June and adults counted in August. Soil cores were examined for larval populations in July.

GRAIN TONNES/HECTARE

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

PYRETH	NONE	CYPERMET	DECAMETH	FENVALER	PERMETH	MEAN
	4.08	4.41	4.06	4.04	4.01	4.12

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

TABLE	PYRETH
SED	0.320

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.453	11.0

GRAIN MEAN DM% 80.5 PLOT AREA HARVESTED 0.00293

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79/R/BE/12

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 - Summerdells II.

Sponsors: A.J. Arnold, F.T. Phillips, P. Etheridge.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 2.67 x 9.14.

Treatments:

SPRAYER	Sprayer used to apply permethrin:
NONE	None
E D T 2	Electrostatic sprayer, spraying direct-charged particles, using tap water and 2 atomisers
E D D 2	Electrostatic sprayer, spraying direct-charged particles, using distilled water and 2 atomisers
E D T 1	Electrostatic sprayer, spraying direct-charged particles, using tap water and 1 atomiser
E O T 2	Electrostatic sprayer, spraying uncharged particles, using tap water and 2 atomisers
F U T	Standard farm sprayer, spraying uncharged particles, using tap water

NOTES: (1) Electrostatic sprayer applied permethrin at 0.016 kg in 15.5 l.
(2) Farm sprayer applied permethrin at 0.016 kg in 340 l.
(3) Permethrin was applied as a water-based spray.
(4) Sprays were applied on 18 June, 1979.
(5) Because of machine failure one replicate of treatment 'E O T 1' was not applied. An Estimated value was used in the analysis.
(6) Because of field errors two of the replicates of E O T 2 were in one block and two of the replicates of NONE in another, since there were marked differences between rows of plots, adjustments have been made by covariance, and the original blocking has been ignored.

Basal applications: Manures: Chalk at 7.5 t, FYM at 35 t. Weedkiller: Simazine at 0.84 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l. Desiccant: Diquat at 0.59 kg ion with 'Agral' (a wetting agent) at 0.28 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 26 Oct, 1978. FYM applied: 14 Nov. Ploughed: 23 Nov. Heavy spring-tine cultivated: 19 Apr, 1979. Rotary harrowed: 20 Apr. Seed sown: 21 Apr. Weedkiller applied: 15 May. Basal insecticide applied: 27 July. Desiccant applied: 24 Sept. Combine harvested: 4 Oct. Previous cropping: Barley 1977 & 1978.

NOTE: Observations were made of charged and uncharged drops on both the upper and lower leaf surfaces, and gross deposition of chemical was assessed. Sitona notch counts were made after treatment sprays.

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79/R/BE/12

GRAIN TONNES/HECTARE

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

SPRAYER	NONE	E D T 2	E D D 2	E D T 1	E O T 2	F U T	MEAN
	0.81	1.25	1.15	0.70	0.58	2.11	1.10

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

TABLE	SPRAYER
SED	0.227

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.247	22.4

GRAIN MEAN DM% 63.8

PLOT AREA HARVESTED 0.00244

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79/R/BE/13

SPRING BEANS

COMPARISON OF FUNGICIDES

Object: To study the effects of a range of fungicides and methods of application on the incidence of diseases and on the yield of spring beans - Long Hoos V 4.

Sponsors: G.A. Salt, J. McEwen, D.P. Yeoman.

Design: Single replicate of 38 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

1. FUNGCIDE — Fungicides:

AL TRI	Aluminium tris (ethylphosphonate) 'Aliette'
BENOMYL	Benomyl
DL METH	DL-methyl N- (2, 6 dimethylphenyl)-N (2 methoxy-acetyl) alaninate. 'Ridomil'
THIABEND	Thiabendazole

2. APP TIME — Application times:

	Seedbed (as seed dressing)	5 June (as foliar spray)	3 July (as foliar spray)
S	Applied	None	None
EF	None	Applied	None
LF	None	None	Applied
S+EF	Applied	Applied	None
S+LF	Applied	None	Applied
EF+LF	None	Applied	Applied
S+EF+LF	Applied	Applied	Applied

plus four extra treatments:

EXTRA

NONE	None (four plots)
STICKER	Methyl cellulose sticker only to seed (two plots)
BE TH S	Benomyl + thiram seed dressing + sticker (two plots)
THI HI S	Thiabendazole high rate seed dressing + sticker (two plots)

NOTES: (1) Rates of application were as follows (a methyl cellulose sticker was used for seed dressings; foliar sprays were in 500 l for the early and 1000 l for the late application)

Treatment	Seed dressings g a.i. per kg seed	Foliar sprays kg a.i. per ha
'Aliette'	4.0	3.4
Benomyl	8.8	1.0
'CGA48998' ('Ridomil')	0.4	0.3
Thiabendazole	1.8	1.0
Thiabendazole high rate	6.0	-
Benomyl	3.0	-
Thiram	3.0	-

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(2) Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Chalk at 2.9 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 2.9 kg) in 340 l. Insecticides: Permethrin at 0.15 kg in 340 l, pirimicarb at 0.14 kg in 340 l.

Seed: Minden.

Cultivations, etc.:- Chalk applied: 31 Oct, 1978. Ploughed: 22 Jan, 1979. Spring-tine cultivated and rolled: 18 Apr. Seed sown: 19 Apr. Weedkillers applied: 1 May. Permethrin applied twice: 26 June, 4 July. Pirimicarb applied twice: 9 and 26 July. Harvested by hand: 13 Sept. Previous cropping: Potatoes 1977, barley 1978.

NOTE: Plant counts were made in May and June, and root disease was assessed in July and August.

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79/R/BE/13

GRAIN TONNES/HECTARE

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

METHOD / FUNGCIDE	S	EF	LF	S+EF	S+LF	EF+LF	S+EF+LF	MEAN
AL TRI	4.41	4.83	4.34	4.16	4.27	4.10	4.26	4.34
BENOMYL	4.22	4.15	4.23	4.34	4.31	4.35	4.04	4.23
DL METH	3.64	4.00	3.70	4.39	4.13	3.89	3.79	3.94
THIABEND	4.15	3.83	3.82	3.96	3.75	4.22	3.46	3.88
MEAN	4.10	4.20	4.02	4.21	4.11	4.14	3.89	4.10

EXTRA	NONE	STICKER	BE TH S	THI HI S	MEAN
	4.08	3.84	4.54	3.74	4.06

GRAND MEAN 4.09

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

TABLE	FUNGCIDE	METHOD	FUNGCIDE METHOD
SED	0.225	0.297	0.595

SEDS INVOLVING EXTRA PLOTS

NONE V THE REMAINDER 0.365
BETWEEN THE REMAINDER 0.421
NONE V FUNGCIDE.METHOD 0.471
ANY OF REMAINDER V FUNGCIDE.METHOD 0.516

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

STRATUM	DF	SE	CV%
WP	6	0.421	10.3

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00015

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79/R/BE/14

SPRING BEANS

RED TICK LINES

Object: To compare agronomic characters and yields of two selections of red-seeded field beans, open-pollinated for one or two years following self-pollination for five years, with four white-seeded varieties - Long Hoos V 4.

Sponsor: J. McEwen.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY	Varieties:-
RT1 OP1	Red tick 1, open-pollinated in 1978 only
RT1 OP2	Red tick 1, open-pollinated in 1977 and 1978
RT3 OP1	Red tick 3, open-pollinated in 1978 only
RT3 OP2	Red tick 3, open-pollinated in 1977 and 1978
BL	Maris Blaze (white-seeded)
HE	Herra (white-seeded)
MI	Minden (white-seeded)
TO	Topless determinant (white seeded ex P.B.I. Cambridge)

NOTE: Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 kg) in 340 l. Insecticides: Permethrin at 0.15 kg in 340 l, pirimicarb at 0.14 kg in 340 l.

Cultivations, etc.:- Chalk applied: 31 Oct, 1978. Ploughed: 22 Jan, 1979. Spring-tine cultivated and rolled: 18 Apr. Seed sown: 19 Apr. Weedkillers applied: 1 May. Permethrin applied twice: 26 June, 4 July. Pirimicarb applied twice: 9 and 26 July. Harvested by hand: 13 Sept. Previous cropping: Potatoes 1977, barley 1978.

NOTE: Plant counts were made after establishment and again before harvest. Components of yield were measured at harvest. N in grain was measured.

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79/R/BE/14

GRAIN TONNES/HECTARE

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

VARIETY	
RT1 OP1	3.94
RT1 OP2	4.41
RT3 OP1	4.16
RT3 OP2	4.12
BL	4.37
HE	4.58
MI	4.90
TO	4.04
MEAN	4.32

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

TABLE	VARIETY
SED	0.227

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.278	6.4

GRAIN MEAN DM% 88.0

PLOT AREA HARVESTED 0.00015

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79/R/BE/15

SPRING BEANS

EFFECTS OF VICIA CRYPTIC VIRUS

Object: To study the effects on growth and yield of field beans of the presence of virus-like particles (provisionally named vicia cryptic virus (VCV)) found in the sap of certain plants - Long Hoos VI/VII 2.

Sponsors: A.J. Cockbain, R.H. Kenten.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 1.52 x 2.43.

Treatments:

LINE V	Line number and VCV infection:
7 V	Line 7, VCV particles present
14 V	" 14, " " "
20 V	" 20, " " "
39 V	" 39, " " "
13 0	" 13, " " absent
15 0	" 15, " " "
17 0	" 17, " " "
38 0	" 38, " " "

NOTE: Seed was sown by hand in rows 51 cm apart seed spaced 30 cm apart in the row.

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 kg) in 340 l. Aphicide: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Cultivations, etc.:- Chalk applied: 31 Oct, 1978. Ploughed: 10 Nov. Spring-tine cultivated: 19 Apr, 1979. Rotary cultivated, seed sown: 20 Apr. Weedkillers applied: 1 May. Permethrin applied twice: 26 June and 4 July. Pirimicarb applied twice: 9 and 26 July. Harvested by hand: 21 Sept. Previous cropping: Potatoes 1977, barley 1978.

NOTE: Plant counts were made at emergence. Pest and disease incidence and growth parameters were assessed throughout the season.

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79/R/BE/15

GRAIN TONNES/HECTARE

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

LINE V	7 V	14 V	20 V	39 V	13 O	15 O	17 O	38 O	MEAN
	4.56	4.41	3.28	4.99	3.93	4.59	4.53	3.45	4.21

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

TABLE	LINE V
SED	0.339

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

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.415	9.9

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00037

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79/R/PE/1 and 79/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 VI/VII 5 and Woburn (W) Far Field II.

Sponsors: A.J. Cockbain, K.E. Fletcher, E.D.M. Macaulay, J. McEwen, G.A. Salt, A.G. Whitehead.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 4.83 x 5.49.

Treatments: All combinations of:-

1. NEMACIDE — Nematicide:
   - NONE — None
   - ALDICARB — Aldicarb at 10 kg to the seedbed

2. INSCTCDE(1) — Early insecticide, to control Sitona:
   - NONE — None
   - PERMETH — Permethrin at 0.15 kg on 8 June (R), 6 June (W)

3. INSCTCDE(2) — Late insecticide, to control pea moth:
   - NONE — None
   - PERMETH — Permethrin at 0.15 kg on 10 July

4. FUNGCIDE — Fungicide:
   - NONE — None
   - FLUOTRIM — Fluotrimazole (as 'Persulon' at 1.5 kg) on 24 July

NOTE: All treatment sprays were applied in 340 l.

Basal applications:
Long Hoos VI/VII 5 (R): Weedkiller: Trietazine and simazine (as 'Remtal SC' at 3.0 kg. in 340 l). Desiccant: Diquat at 0.79 kg ion in 340 l.
Far Field II (W): Manures: Magnesian limestone at 7.5 t. (0:14:28) at 340 kg. Desiccant: Diquat at 0.79 kg in 340 l.

Seed: Filby dressed thiram, sown at 220 kg, on both sites.

Cultivations, etc.:-
Long Hoos VI/VII 5 (R): Ploughed: 17 Nov, 1978. Spring-tine cultivated twice: 23 Apr, 1979, 8 May. Aldicarb applied, rotary cultivated, seed sown: 8 May. Weedkiller applied: 9 May. Desiccant applied: 28 Aug. Harvested by hand and threshed by combine harvester: 4 Sept. Previous cropping; Maize 1977, barley 1978.
Far Field II (W): Magnesian limestone applied: 15 Sept, 1978. Heavy spring-tine cultivated twice: 3 Oct, 8 Nov. PK applied, spring-tine cultivated: 18 Apr, 1979. Aldicarb applied, rotary cultivated, seed sown: 15 May. Desiccant applied: 28 Aug. Harvested by hand and threshed by combine harvester: 4 Sept. Previous cropping: Potatoes 1977, barley 1978.

NOTE: Observations on pests and diseases were made during the season. Nitrogen percentages of grain were measured.

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79/R/PE/1 LONG HOOS VI/VII(R)

GRAIN TONNES/HECTARE

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

INSCTCDE(1)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	4.19	4.13	4.16
ALDICARB	5.43	5.35	5.39
MEAN	4.81	4.74	4.77

INSCTCDE(2)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	4.08	4.24	4.16
ALDICARB	5.41	5.36	5.39
MEAN	4.75	4.80	4.77

INSCTCDE(2)	NONE	PERMETH	MEAN
INSCTCDE(1)			
NONE	4.74	4.88	4.81
PERMETH	4.75	4.72	4.74
MEAN	4.75	4.80	4.77

FUNGCIDE	NONE	FLUOTRIM	MEAN
NEMACIDE			
NONE	4.16	4.16	4.16
ALDICARB	5.37	5.40	5.39
MEAN	4.77	4.78	4.77

FUNGCIDE	NONE	FLUOTRIM	MEAN
INSCTCDE(1)			
NONE	4.82	4.80	4.81
PERMETH	4.71	4.76	4.74
MEAN	4.77	4.78	4.77

FUNGCIDE	NONE	FLUOTRIM	MEAN
INSCTCDE(2)			
NONE	4.77	4.73	4.75
PERMETH	4.77	4.83	4.80
MEAN	4.77	4.78	4.77

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
NEMACIDE				
NONE	4.05	4.34	4.12	4.14
ALDICARB	5.44	5.41	5.39	5.30

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE				
NONE	4.34	4.05	3.99	4.27
ALDICARB	5.31	5.54	5.44	5.26

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79/R/PE/1 LONG HOOS VI/VII(R)

GRAIN TONNES/HECTARE

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

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE				
NONE	4.22	3.94	4.10	4.38
ALDICARB	5.31	5.51	5.44	5.28

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
INSCTCDE(1)				
NONE	4.65	4.83	5.00	4.76
PERMETH	4.88	4.62	4.54	4.90

INSCTCDE(2)		NONE		PERMETH	
FUNGCIDE		NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE	INSCTCDE(1)				
NONE	NONE	4.08	4.01	4.59	4.09
	PERMETH	4.37	3.87	3.61	4.67
ALDICARB	NONE	5.22	5.65	5.40	5.43
	PERMETH	5.40	5.38	5.47	5.14

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

TABLE	NEMACIDE	INSCTCDE(1)	INSCTCDE(2)	FUNGCIDE
SED	0.171	0.171	0.171	0.171

TABLE	NEMACIDE INSCTCDE(1)	NEMACIDE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	NEMACIDE FUNGCIDE
SED	0.242	0.242	0.242	0.242

TABLE	INSCTCDE(1) FUNGCIDE	INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(1) INSCTCDE(2)	NEMACIDE INSCTCDE(1) FUNGCIDE
SED	0.242	0.242	0.342	0.342

TABLE	NEMACIDE INSCTCDE(2) FUNGCIDE	INSCTCDE(1) INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(1) INSCTCDE(2) FUNGCIDE
SED	0.342	0.342	0.484

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.484	10.1

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED 0.00091

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79/W/PE/1 FAR FIELD II (W)

GRAIN TONNES/HECTARE

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

INSCTCDE(1)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	3.61	3.66	3.64
ALDICARB	4.23	4.16	4.19
MEAN	3.92	3.91	3.92

INSCTCDE(2)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	3.57	3.71	3.64
ALDICARB	4.14	4.25	4.19
MEAN	3.85	3.98	3.92

INSCTCDE(2)	NONE	PERMETH	MEAN
INSCTCDE(1)			
NONE	3.88	3.97	3.92
PERMETH	3.83	3.99	3.91
MEAN	3.85	3.98	3.92

FUNGCIDE	NONE	FLUOTRIM	MEAN
NEMACIDE			
NONE	3.64	3.63	3.64
ALDICARB	4.29	4.10	4.19
MEAN	3.97	3.86	3.92

FUNGCIDE	NONE	FLUOTRIM	MEAN
INSCTCDE(1)			
NONE	3.97	3.87	3.92
PERMETH	3.96	3.86	3.91
MEAN	3.97	3.86	3.92

FUNGCIDE	NONE	FLUOTRIM	MEAN
INSCTCDE(2)			
NONE	3.92	3.78	3.85
PERMETH	4.01	3.95	3.98
MEAN	3.97	3.86	3.92

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
NEMACIDE				
NONE	3.60	3.63	3.54	3.78
ALDICARB	4.15	4.30	4.12	4.20

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE				
NONE	3.72	3.51	3.56	3.76
ALDICARB	4.22	4.23	4.36	3.96

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79/W/PE/1 FAR FIELD II (W)

GRAIN TONNES/HECTARE

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

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE				
NONE	3.59	3.55	3.69	3.72
ALDICARB	4.25	4.02	4.33	4.17

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	FLUOTRIM	NONE	FLUOTRIM
INSCTCDE(1)				
NONE	3.95	3.80	3.99	3.94
PERMETH	3.90	3.76	4.03	3.95

INSCTCDE(2)		NONE		PERMETH	
FUNGCIDE		NONE	FLUOTRIM	NONE	FLUOTRIM
NEMACIDE	INSCTCDE(1)				
NONE	NONE	3.64	3.55	3.79	3.47
	PERMETH	3.54	3.54	3.59	3.97
ALDICARB	NONE	4.25	4.06	4.19	4.41
	PERMETH	4.26	3.98	4.47	3.94

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

TABLE	NEMACIDE	INSCTCDE(1)	INSCTCDE(2)	FUNGCIDE
SED	0.120	0.120	0.120	0.120

TABLE	NEMACIDE INSCTCDE(1)	NEMACIDE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	NEMACIDE FUNGCIDE
SED	0.170	0.170	0.170	0.170

TABLE	INSCTCDE(1) FUNGCIDE	INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(1) INSCTCDE(2)	NEMACIDE INSCTCDE(1) FUNGCIDE
SED	0.170	0.170	0.240	0.240

TABLE	NEMACIDE INSCTCDE(2) FUNGCIDE	INSCTCDE(1) INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(1) INSCTCDE(2) FUNGCIDE
SED	0.240	0.240	0.340

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.340	8.7

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00091

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79/R/FE/1

FENUGREEK

N AND RHIZOBIUM

Object: To study the effects of inoculation with Rhizobium and times of applying nitrogen fertiliser on nodulation and yield of fenugreek (Trigonella foenum-graecum) - Long Hoos V O & E. S.

Sponsor: D.P. Yeoman.

Design: 2 randomised blocks of 6 plots.

Whole plot dimensions: 1.52 x 2.13.

Treatments: All combinations of:

1. INOCULUM		Inoculum applied to the seed:
	NONE	None
	RHIZOBUM	Rhizobium meliloti, strain 2012
2. N		Nitrogen fertiliser (kg N) and times of application:
	0	None
	150 S	150 to the seedbed, on 8 May
	150 F	150 at flowering, on 2 July

Basal applications: Insecticide: Permethrin at 0.15 kg in 340 l.

Seed: Margaret, hand sown, seed spaced 5 cm apart in rows 38 cm apart.

Cultivations, etc.:- Ploughed: 5 Mar, 1979. Spring-tine cultivated twice and rotary cultivated: 1 May. Spring-tine cultivated, seed furrows drawn out, and seed sown: 8 May. Insecticide applied twice: 30 May and 29 June. Harvested (by hand) on 3 and 15 Oct. Previous cropping: Fallow 1977 & 1978.

NOTE: Two harvest dates were necessary because ripening was uneven. INOCULUM NONE (except the combination with N 150 F) and one of the replicates of INOCULUM RHIZOBUM combinations with N 0 and N 150 S were harvested on 3 Oct. All remaining plots were harvested on 15 Oct.

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79/R/FE/1

GRAIN TONNES/HECTARE

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

N	0	150 S	150 F	MEAN
INOCULUM				
NONE	0.70	2.64	1.10	1.48
RHIZOBUM	1.94	2.11	2.56	2.20
MEAN	1.32	2.37	1.83	1.84

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

TABLE	INOCULUM	N	INOCULUM N
SED	0.185	0.226	0.320

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.320	17.4

GRAIN MEAN DM% 87.3

PLOT AREA HARVESTED 0.00012

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79/R/MA/1

FORAGE MAIZE

RATES & TIMES OF N

Object: To study the effects of a range of nitrogen fertiliser rates, applied before sowing or to the seedbed, on the yields and nitrogen uptakes of forage maize - Long Hoos VI/VII 4.

Sponsor: A.J. Barnard.

Design: 2 randomised blocks of 32 plots.

Whole plot dimensions: 2.13 x 3.66.

Treatments: All combinations of:

1. EARLY N — Rates of nitrogen fertiliser (kg N) applied on 6 April, 1979:

   0
   60
   120
   180

2. SDBED N — Rates of nitrogen fertiliser (kg N) applied on 13 June 1979:

   0
   30
   60
   90
   120
   150
   180
   210

Basal applications: Weedkiller: Atrazine (as 'Vectal SC' at 3.4 kg) in 340 l. Insecticides: Dimethoate at 0.67 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Seed: Fronica, sown at 100,000 seeds per hectare.

Cultivations, etc.:- Ploughed twice: 16 Nov, 1978 and 6 Mar, 1979. Spring-tine cultivated: 5 Apr. Power harrowed, seed sown: 7 June. Weedkiller applied: 11 June. Dimethoate applied: 29 June. Pirimicarb applied: 26 July. Harvested by hand: 30 Oct. Previous cropping: Wheat 1977 and 1978.

NOTES: (1) Plant population counts were made in July.
(2) Nitrogen percentages in harvested produce were determined.
(3) Because of an inadequate stand on 2 plots of treatment combination

EARLY N	0	180
SDBED N	0	210

yields were not recorded. Estimated values were used in the analysis.

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79/R/MA/1

FORAGE MAIZE TONNES/HECTARE

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

SDBED N / EARLY N	0	30	60	90	120	150	180	210	MEAN
0	6.58	5.97	10.40	9.64	8.47	9.27	11.00	9.98	8.91
60	6.74	7.87	10.97	9.83	11.40	10.74	8.60	10.59	9.59
120	11.46	10.71	7.56	9.55	9.26	10.07	9.88	9.10	9.70
180	11.00	8.86	8.12	10.58	10.98	9.80	10.43	12.12	10.24
MEAN	8.95	8.35	9.26	9.90	10.03	9.97	9.98	10.45	9.61

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

TABLE	EARLY N	SDBED N	EARLY N SDBED N
SED	0.490	0.692	1.385

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	1.385	14.4

GRAIN MEAN DM% 21.2

PLOT AREA HARVESTED 0.00039

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79/R/P/4 and 79/W/P/4

POTATOES

SEED STOCKS & TIMES OF APPLYING FUNGICIDES

Object: To study the effects of times of applying fungicides to seed tubers soon after lifting on the yield and infection of progeny tubers and on diseases in subsequent storage - Rothamsted (R) Delafield and Woburn (W) Horsepool.

Sponsors: G.A. Hide, G.R. Cayley.

Design: 3 experiments each 4 randomised blocks of 20 plots.

Whole plot dimensions: 1.42 x 9.53 at both sites.

Treatments: Three experiments: Rothamsted, variety King Edward (KE)
Rothamsted, variety Pentland Crown (PC)
Woburn, Pentland Crown (PC)
each tested all combinations of:-

1. SD STOCK		Seed stock source and health certificate:		
R	R&W	R		R&W
KE	PC	KE		PC
PER FS1	PER FS1	Perthshire FS1		Perthshire FS1
LIN OG	LIN OG	Lincolnshire Once grown		Lincolnshire Once grown
ANG OG	ROTH OG	Angus Once grown		Rothamsted Once grown
HER OG	ESS OG	Hertfordshire (B. Stortford Once grown)		Essex Once grown
2. FUNGCIDE		Fungicides:		
IMAZALIL		Imazalil at 0.8 g in 2 l per t of tubers		
THIABEND		Thiabendazole at 40 g in 2 l per t of tubers		
3. FUNGTIME		Times of applying fungicides:		
LIFT		At lifting (R) 24 Oct, (W) 17 Oct		
LIFT+BOX		At lifting and at boxing (R&W) 20 Nov		

plus four extra treatments:

NO FUNG		Seed not treated, fungicide seed stocks as above:
R	R&W	
KE	PC	
PER FS1	PER FS1	
LIN OG	LIN OG	
ANG OG	ROTH OG	
HER OG	ESS OG	

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79/R/P/4 and 79/W/P/4

Basal applications:

Delafield (R): Manures: (13:13:20) at 1510 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.42 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l applied six times, with insecticide on the first two occasions. Insecticide: Pirimicarb at 0.14 kg applied on two occasions. Desiccant: Undiluted BOV at 170 l.

Horsepool (W): Manures: (13:13:20) at 1850 kg. Weedkillers: Linuron at 1.0 kg with paraquat at 0.28 kg ion in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l applied six times, with insecticide on the first two occasions. Insecticide: Pirimicarb at 0.14 kg applied on two occasions. Desiccant: Undiluted BOV at 170 l.

Cultivations, etc.:-

Delafield (R): Ploughed: 12 Dec, 1978. Heavy spring-tine cultivated: 21 Apr, 1979. NPK applied: 1 May. Spike rotary cultivated: 8 May. Ridged up, hand planted and split back: 9 May. Grubbed: 16 May. Rotary ridged: 18 May. Weedkillers applied: 30 May. Fungicide applied: 26 June, 5 July, 20 July, 3 Aug, 15 Aug, 4 Sept. Insecticide applied: 26 June, 5 July. Desiccant applied: 21 Sept. Lifted: 12 Oct. Previous crops: Barley 1977, kale 1978.

Horsepool (W): Heavy spring-tine cultivated: 6 Sept, 1978. Subsoiled, tines 58 cm deep, 140 cm apart: 12 Sept. Rotary cultivated: 9 Nov. Ploughed: 24 Nov. NPK applied: 5 May, 1979. Heavy spring-tine cultivated: 8 May. Ridged up, hand planted, split back: 10 May. Weedkillers applied: 25 May. Fungicide applied: 27 June, 10 July, 23 July, 10 Aug, 25 Aug, 6 Sept. Insecticide applied: 27 June, 10 July. Desiccant applied: 24 Sept. Lifted: 15 Oct. Previous crops: Wheat 1977, W. oats 1978.

NOTE: Plant emergence counts were made in June and plant samples were taken in August for estimates of stem and tuber infections.

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79/R/P/4 DELAFIELD(R)

KING EDWARD

TOTAL TUBERS TONNES/HECTARE

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

FUNGCIDE SD STOCK	IMAZALIL	THIABEND	MEAN
PER FS1	37.5	36.6	37.1
LIN OG	29.8	30.6	30.2
ANG OG	33.1	35.2	34.1
HER OG	31.0	31.5	31.2
MEAN	32.9	33.5	33.2

FUNGTIME SD STOCK	LIFT	LIFT+BOX	MEAN
PER FS1	38.2	35.9	37.1
LIN OG	30.6	29.8	30.2
ANG OG	35.0	33.3	34.1
HER OG	30.4	32.1	31.2
MEAN	33.6	32.8	33.2

FUNGTIME FUNGCIDE	LIFT	LIFT+BOX	MEAN
IMAZALIL	33.1	32.6	32.9
THIABEND	34.0	32.9	33.5
MEAN	33.6	32.8	33.2

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME	LIFT	LIFT+BOX	LIFT	LIFT+BOX
SD STOCK				
PER FS1	38.7	36.4	37.8	35.4
LIN OG	29.7	29.9	31.5	29.7
ANG OG	34.0	32.2	36.1	34.3
HER OG	30.1	31.9	30.6	32.3

NO FUNG	PER FS1	LIN OG	ANG OG	HER OG	MEAN
	36.9	28.3	33.4	29.2	31.9

GRAND MEAN 32.9

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

TABLE	NO FUNG	SD STOCK	FUNGCIDE	FUNGTIME
SED	1.13	0.56	0.40	0.40

TABLE	SD STOCK FUNGCIDE	SD STOCK FUNGTIME	FUNGCIDE FUNGTIME	SD STOCK FUNGCIDE FUNGTIME & NO FUNG
SED	0.80	0.80	0.56	1.13

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

STRATUM	DF	SE	CV%
BLOCK.WP	57	1.60	4.9

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79/R/P/4 DELAFIELD(R)

KING EDWARD

PERCENTAGE WARE 4.44CM (1.75INCH) RIDDLE

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

FUNGCIDE SD STOCK	IMAZALIL	THIABEND	MEAN
PER FS1	34.7	29.9	32.3
LIN OG	32.7	28.1	30.4
ANG OG	34.8	31.4	33.1
HER OG	38.2	35.4	36.8
MEAN	35.1	31.2	33.2

FUNGTIME SD STOCK	LIFT	LIFT+BOX	MEAN
PER FS1	34.0	30.6	32.3
LIN OG	31.9	28.9	30.4
ANG OG	34.5	31.6	33.1
HER OG	39.2	34.4	36.8
MEAN	34.9	31.4	33.2

FUNGTIME FUNGCIDE	LIFT	LIFT+BOX	MEAN
IMAZALIL	36.2	34.0	35.1
THIABEND	33.6	28.8	31.2
MEAN	34.9	31.4	33.2

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME	LIFT	LIFT+BOX	LIFT	LIFT+BOX
SD STOCK				
PER FS1	37.2	32.3	30.9	29.0
LIN OG	33.7	31.7	30.0	26.2
ANG OG	33.1	36.4	36.0	26.9
HER OG	40.8	35.6	37.5	33.3

NO FUNG	PER FS1	LIN OG	ANG OG	HER OG	MEAN
	30.4	40.4	38.3	32.0	35.3

GRAND MEAN 33.6

PLOT AREA HARVESTED 0.00114

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79/R/P/4 DELAFIELD(R)

PENTLAND CROWN

TOTAL TUBERS TONNES/HECTARE

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

FUNGCIDE SD STOCK	IMAZALIL	THIABEND	MEAN
PER FS1	31.7	31.7	31.7
LIN OG	31.2	30.3	30.7
ROTH OG	34.0	33.5	33.8
ESS OG	30.0	30.0	30.0
MEAN	31.7	31.4	31.6

FUNGTIME SD STOCK	LIFT	LIFT+BOX	MEAN
PER FS1	34.0	29.5	31.7
LIN OG	32.3	29.2	30.7
ROTH OG	34.5	33.0	33.8
ESS OG	29.4	30.6	30.0
MEAN	32.6	30.6	31.6

FUNGTIME FUNGCIDE	LIFT	LIFT+BOX	MEAN
IMAZALIL	33.0	30.4	31.7
THIABEND	32.1	30.7	31.4
MEAN	32.6	30.6	31.6

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME	LIFT	LIFT+BOX	LIFT	LIFT+BOX
SD STOCK				
PER FS1	33.5	30.0	34.6	28.9
LIN OG	33.3	29.1	31.2	29.4
ROTH OG	34.9	33.1	34.0	33.0
ESS OG	30.5	29.6	28.4	31.6

NO FUNG	PER FS1	LIN OG	ROTH OG	ESS OG	MEAN
	33.8	30.2	34.2	29.3	31.9

GRAND MEAN 31.6

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

TABLE	NO FUNG	SD STOCK	FUNGCIDE	FUNGTIME
SED	1.75	0.87	0.62	0.62

TABLE	SD STOCK FUNGCIDE	SD STOCK FUNGTIME	FUNGCIDE FUNGTIME	SD STOCK FUNGCIDE FUNGTIME & NO FUNG
SED	1.24	1.24	0.87	1.75

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

STRATUM	DF	SE	CV%
BLOCK.WP	57	2.47	7.8

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79/R/P/4 DELAFIELD(R)

PENTLAND CROWN

PERCENTAGE WARE 4.44CM (1.75INCH) RIDDLE

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

FUNGCIDE	IMAZALIL	THIABEND	MEAN
SD STOCK			
PER FS1	71.5	68.5	70.0
LIN OG	69.8	67.1	68.5
ROTH OG	62.3	63.9	63.1
ESS OG	73.0	70.8	71.9
MEAN	69.1	67.6	68.4

FUNGTIME	LIFT	LIFT+BOX	MEAN
SD STOCK			
PER FS1	70.8	69.1	70.0
LIN OG	69.2	67.8	68.5
ROTH OG	62.4	63.8	63.1
ESS OG	71.5	72.3	71.9
MEAN	68.4	68.3	68.4

FUNGTIME	LIFT	LIFT+BOX	MEAN
FUNGCIDE			
IMAZALIL	68.7	69.6	69.1
THIABEND	68.2	66.9	67.6
MEAN	68.4	68.3	68.4

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME	LIFT	LIFT+BOX	LIFT	LIFT+BOX
SD STOCK				
PER FS1	72.4	70.5	69.2	67.8
LIN OG	69.3	70.4	69.1	65.2
ROTH OG	62.4	62.2	62.4	65.4
ESS OG	70.7	75.2	72.2	69.4

NO FUNG	PER FS1	LIN OG	ROTH OG	ESS OG	MEAN
	59.2	67.3	57.3	62.6	61.6

GRAND MEAN 67.0

PLOT AREA HARVESTED 0.00114

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79/W/P/4 HORSEPOOL(W)

PENTLAND CROWN

TOTAL TUBERS TONNES/HECTARE

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

FUNGCIDE SD STOCK	IMAZALIL	THIABEND	MEAN
PER FS1	37.1	33.9	35.5
LIN OG	37.6	38.3	38.0
ROTH OG	42.9	39.3	41.1
ESS OG	33.1	35.5	34.3
MEAN	37.7	36.8	37.2

FUNGTIME SD STOCK	LIFT	LIFT+BOX	MEAN
PER FS1	37.1	33.9	35.5
LIN OG	39.5	36.4	38.0
ROTH OG	39.6	42.6	41.1
ESS OG	37.3	31.3	34.3
MEAN	38.4	36.1	37.2

FUNGTIME FUNGCIDE	LIFT	LIFT+BOX	MEAN
IMAZALIL	39.3	36.1	37.7
THIABEND	37.5	36.0	36.8
MEAN	38.4	36.1	37.2

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME	LIFT	LIFT+BOX	LIFT	LIFT+BOX
SD STOCK				
PER FS1	40.4	33.8	33.8	34.1
LIN OG	39.5	35.7	39.5	37.2
ROTH OG	42.7	43.1	36.5	42.1
ESS OG	34.5	31.8	40.2	30.8

NO FUNG	PER FS1	LIN OG	ROTH OG	ESS OG	MEAN
	35.8	41.0	41.9	33.4	38.0

GRAND MEAN 37.4

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

TABLE	NO FUNG	SD STOCK	FUNGCIDE	FUNGTIME
SED	3.62	1.81	1.28	1.28

TABLE	SD STOCK FUNGCIDE	SD STOCK FUNGTIME	FUNGCIDE FUNGTIME	SD STOCK FUNGCIDE FUNGTIME & NO FUNG
SED	2.56	2.56	1.81	3.62

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

STRATUM	DF	SE	CV%
BLOCK.WP	57	5.12	13.7

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79/W/P/4 HORSEPOOL(W)

PENTLAND CROWN

PERCENTAGE WARE 4.44CM (1.75INCH) RIDDLE

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

FUNGCIDE SD STOCK	IMAZALIL	THIABEND	MEAN
PER FS1	76.3	69.4	72.9
LIN OG	76.7	77.0	76.9
ROTH OG	76.6	72.5	74.5
ESS OG	72.7	73.0	72.8
MEAN	75.6	73.0	74.3

FUNGTIME SD STOCK	LIFT	LIFT+BOX	MEAN
PER FS1	72.7	73.0	72.9
LIN OG	77.5	76.3	76.9
ROTH OG	74.0	75.0	74.5
ESS OG	74.8	70.9	72.8
MEAN	74.7	73.8	74.3

FUNGTIME FUNGCIDE	LIFT	LIFT+BOX	MEAN
IMAZALIL	76.4	74.8	75.6
THIABEND	73.1	72.8	73.0
MEAN	74.7	73.8	74.3

FUNGCIDE	IMAZALIL		THIABEND	
FUNGTIME SD STOCK	LIFT	LIFT+BOX	LIFT	LIFT+BOX
PER FS1	78.1	74.6	67.3	71.5
LIN OG	76.8	76.7	78.1	75.9
ROTH OG	75.8	77.4	72.3	72.6
ESS OG	74.9	70.5	74.7	71.3

NO FUNG	PER FS1	LIN OG	ROTH OG	ESS OG	MEAN
	74.7	77.4	77.7	74.5	76.1

GRAND MEAN 74.6

PLOT AREA HARVESTED 0.00114

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79/R/P/6

POTATOES

EFFECTS OF SPACING AND LODGING

Object: To study the effects of spacing and artificial lodging on radiation interception, crop growth - rates and yield - White Horse II.

Sponsor: D.W. Wood.

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

Whole plot dimensions: 4.27 x 12.8.

Treatments: All combinations of:-

Whole plots

1. SEEDSIZE	Size range of seed tubers:	
	SMALL	40 to 60 g
	LARGE	80 to 100 g

Sub plots

2. SPACING	Spacing within ridges 71 cm apart:	
	25 CM	
	50 CM	
3. LODGING	Artificial lodging:	
	NONE	None
	EARLY	Early 21 July
	LATE	Later 29 Aug

Basal applications: Manures: (13:13:20) at 1500 kg. Weedkillers: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l applied six times, with insecticide on the first two occasions. Insecticide: Pirimicarb at 0.14 kg applied twice. Irrigation: 82 mm.

Seed: Pentland Crown.

Cultivations, etc.:- Subsoiled, tines 45 cm deep and 100 cm apart: 4 Nov, 1978. Ploughed: 7 Nov. Heavy spring-tine cultivated: 27 Apr, 1979. NPK applied: 8 May. Spike rotary cultivated twice, ridged, hand planted and split back: 9 May. Grubbed: 18 May. Weedkillers applied: 1 June. Grubbed: 19 June. Rotoridged: 21 June. Insecticide and fungicide applied twice: 26 June and 5 July. Irrigation at 25 mm applied twice: 14 July and 19 July. Fungicide applied four times: 20 July, 3 Aug, 15 Aug and 4 Sept. Irrigation applied at 32 mm: 27 July. Lifted: 18 Oct. Previous cropping: Barley 1977 and 1978.

NOTE: Seed sprout characteristics were assessed at planting. Emergence counts were made daily in early June. Full growth analyses were done at 21-day intervals between early July and mid October. Radiation interception was measured at 14-day intervals between mid July and early October.

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79/R/P/6

TOTAL TUBERS TONNES/HECTARE

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

SPACING	25 CM	50 CM	MEAN
SEEDSIZE			
SMALL	48.0	46.2	47.1
LARGE	46.9	45.2	46.1
MEAN	47.5	45.7	46.6

LODGING	NONE	EARLY	LATE	MEAN
SEEDSIZE				
SMALL	48.2	46.2	46.9	47.1
LARGE	47.2	44.7	46.3	46.1
MEAN	47.7	45.5	46.6	46.6

LODGING	NONE	EARLY	LATE	MEAN
SPACING				
25 CM	49.8	45.6	47.0	47.5
50 CM	45.6	45.3	46.2	45.7
MEAN	47.7	45.5	46.6	46.6

SPACING	25 CM			50 CM		
LODGING	NONE	EARLY	LATE	NONE	EARLY	LATE
SEEDSIZE						
SMALL	49.9	45.9	48.1	46.5	46.5	45.7
LARGE	49.7	45.3	45.8	44.7	44.2	46.8

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

TABLE	SPACING	LODGING	SEEDSIZE* SPACING
SED	1.02	1.25	1.45

TABLE	SEEDSIZE* LODGING	SPACING LODGING	SEEDSIZE* SPACING LODGING
SED	1.77	1.77	2.51

* USE ONLY WITHIN THE SAME LEVEL OF SEEDSIZE

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	10	2.51	5.4

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79/R/P/6

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

SPACING	25 CM	50 CM	MEAN
SEEDSIZE			
SMALL	85.8	91.7	88.7
LARGE	76.6	89.2	82.9
MEAN	81.2	90.4	85.8

LODGING	NONE	EARLY	LATE	MEAN
SEEDSIZE				
SMALL	90.0	85.3	90.8	88.7
LARGE	83.0	83.0	82.7	82.9
MEAN	86.5	84.2	86.8	85.8

LODGING	NONE	EARLY	LATE	MEAN
SPACING				
25 CM	82.1	77.5	84.0	81.2
50 CM	90.9	90.8	89.6	90.4
MEAN	86.5	84.2	86.8	85.8

SPACING	25 CM			50 CM		
LODGING	NONE	EARLY	LATE	NONE	EARLY	LATE
SEEDSIZE						
SMALL	88.3	77.7	91.4	91.8	93.0	90.2
LARGE	75.9	77.4	76.6	90.0	88.6	88.9

SUB PLOT AREA HARVESTED 0.00130

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79/R/G/1

GRASS

LIQUID FERTILISER AND NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid fertilisers on the yield and nitrogen uptake of grass cut for silage - Great Harpenden I.

Sponsors: J. Ashworth, G.A. Rodgers, F.V. Widdowson, A. Penny.

Design: 3 blocks of 3 whole plots split into 4 sub plots plus 1 extra whole plot split into 4 and 4 extra sub plots.

Whole plot dimensions: 2.44 x 9.14.

Treatments: All combinations of:-

Whole plots

1. N TIME — Times of injecting aqueous urea and nitrification inhibitors:

AU	Autumn, 22 Nov, 1978
ES	Early spring, 4 Apr, 1979
LS	Late spring, 25 Apr, 1979

Sub plots

2. N IHIB — Nitrification inhibitors, added to aqueous urea supplying 375 kg N:

U3 0	None
U3 NI	Nitrapyrin at 1.5 kg
U3 DX	Diethyl xanthate at 1.5 kg
U3 PX	Potassium ethyl xanthate at 10 kg

Plus eight extra treatments

Extra sub plots

3. EXTRA(1) — 'Nitro-Chalk' (kg N) dressing divided equally between three dates of application: 4 Apr, 8 June, 27 July

0	None
NC2 ES	250
NC3 ES	375
NC4 ES	500

Extra whole plots

EXTRA(2) — Nitrification inhibitors, added to a mixture of aqueous urea and ammonium nitrate supplying 375 kg N, injected on 4 Apr:

UA3ES 0	None
UA3ES NI	Nitrapyrin at 1.5 kg
UA3ES DX	Diethyl xanthate at 1.5 kg
UA3ES PX	Potassium ethyl xanthate at 10 kg

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79/R/G/1

Basal applications: (0:14:28) at 500 kg.

Seed: S.24 perennial ryegrass sown May,1977

Cultivations, etc.:- Topped: 14 Nov, 1978. PK applied: 16 Nov. Cut: 4 June, 1979, 24 July, 22 Oct.

NOTES: (1) Soil cores were taken to 1 m depth (in March from autumn injected plots only) and 20 cm depth (during the season from all plots) and tested for urea, ammonium and nitrate.
(2) 15N was used on two plots to assess the immobilisation of fertiliser N.
(3) Grass from the first two cuts was tested for nitrate, and from all cuts for organic N.

1ST CUT (4/6/79) DRY MATTER TONNES/HECTARE

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

N TIME / N INHIB	AU	ES	LS	MEAN
U3 0	7.29	5.54	3.00	5.28
U3 NI	6.81	5.26	2.87	4.98
U3 DX	6.95	5.34	3.10	5.13
U3 PX	6.72	5.04	3.28	5.01
MEAN	6.94	5.29	3.06	5.10

EXTRA(1)	0	NC2 ES	NC3 ES	NC4 ES	MEAN
	1.00	4.18	4.77	5.41	3.84

EXTRA(2)	UA3ES 0	UA3ES NI	UA3ES DX	UA3ES PX	MEAN
	5.29	5.27	5.17	5.55	5.32

GRAND MEAN 4.89

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

TABLE	N TIME	N INHIB	EXTRA(1)	EXTRA(2)
SED	0.222	0.158	0.445	0.273

TABLE	N TIME / N INHIB
SED	0.324

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

N TIME	0.273

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.334	6.8

1ST CUT MEAN DM% 16.2

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79/R/G/1

2ND CUT (24/7/79) DRY MATTER TONNES/HECTARE

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

N TIME / N INHIB	AU	ES	LS	MEAN
U3 0	1.31	3.47	4.67	3.15
U3 NI	2.18	3.39	4.57	3.38
U3 DX	1.55	3.62	4.44	3.20
U3 PX	1.41	3.30	4.28	3.00
MEAN	1.61	3.44	4.49	3.18

EXTRA(1)	0	NC2 ES	NC3 ES	NC4 ES	MEAN
	0.21	2.91	3.78	4.07	2.74

EXTRA(2)	UA3ES 0	UA3ES NI	UA3ES DX	UA3ES PX	MEAN
	2.61	3.35	3.16	2.98	3.02

GRAND MEAN 3.06

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

TABLE	N TIME	N INHIB	EXTRA(1)	EXTRA(2)
SED	0.188	0.099	0.375	0.172

TABLE	N TIME / N INHIB
SED	0.239

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

N TIME	0.172

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.210	6.9

2ND CUT MEAN DM% 27.7

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79/R/G/1

3RD CUT (22/10/79) DRY MATTER TONNES/HECTARE

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

N TIME / N INHIB	AU	ES	LS	MEAN
U3 0	0.28	0.51	0.89	0.56
U3 NI	0.42	0.55	0.96	0.64
U3 DX	0.37	0.60	0.73	0.57
U3 PX	0.32	0.51	0.80	0.55
MEAN	0.35	0.54	0.84	0.58

EXTRA(1)	0	NC2 ES	NC3 ES	NC4 ES	MEAN
	0.06	2.12	2.63	2.65	1.87

EXTRA(2)	UA3ES 0	UA3ES NI	UA3ES DX	UA3ES PX	MEAN
	0.35	0.41	0.42	0.42	0.40

GRAND MEAN 0.80

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

TABLE	N TIME	N INHIB	EXTRA(1)	EXTRA(2)
SED	0.070	0.053	0.140	0.092

TABLE	N TIME / N INHIB
SED	0.106

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

N TIME	0.092

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.113	14.2

3RD CUT MEAN DM% 35.9

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79/R/G/1

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

N TIME / N INHIB	AU	ES	LS	MEAN
U3 0	8.88	9.51	8.55	8.98
U3 NI	9.42	9.20	8.39	9.00
U3 DX	8.86	9.56	8.27	8.90
U3 PX	8.45	8.85	8.36	8.56
MEAN	8.90	9.28	8.39	8.86

EXTRA(1)	0	NC2 ES	NC3 ES	NC4 ES	MEAN
	1.27	9.22	11.18	12.13	8.45

EXTRA(2)	UA3ES 0	UA3ES NI	UA3ES DX	UA3ES PX	MEAN
	8.25	9.03	8.75	8.95	8.74

GRAND MEAN 8.75

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

TABLE	N TIME	N INHIB	EXTRA(1)	EXTRA(2)
SED	0.325	0.193	0.650	0.334

TABLE	N TIME / N INHIB
SED	0.435
EXCEPT WHEN COMPARING MEANS WITH THE SAME LEVEL(S) OF:	
N TIME	0.334

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.409	4.7

GRAND MEAN 8.75

TOTAL OF 3 CUTS MEAN DM% 26.6

PLOT AREA HARVESTED 0.00104

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METEOROLOGICAL RECORDS 1979 - 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	53 (+1)	-1.3 (-4.3)	-2.7	3.0	5.9
FEB	54 (-13)	0.7 (-2.7)	-1.0	2.1	4.1
MAR	90 (-25)	4.3 (-0.8)	2.0	4.0	4.5
APR	114 (-37)	7.6 (+0.0)	4.1	7.1	6.0
MAY	202 (+8)	10.3 (-0.7)	6.0	10.5	8.5
JUNE	143 (-60)	13.6 (-0.4)	10.6	14.2	11.5
JULY	183 (-9)	15.9 (-0.3)	11.4	15.7	13.5
AUG	162 (-18)	15.0 (-0.6)	11.0	15.6	14.3
SEPT	172 (+28)	13.4 (+0.0)	9.7	14.2	13.8
OCT	117 (+14)	11.0 (+1.4)	9.4	12.2	12.6
NOV	63 (+1)	5.9 (+0.1)	4.5	8.3	10.1
DEC	52 (+7)	5.2 (+1.4)	3.0	7.0	8.6
YEAR*	1405(-103)	8.4 (-0.5)	5.7	9.5	9.5

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	29	77 (+12)	20	57	9.3
FEB	27	71 (+22)	13	67	10.0
MAR	16	133 (+84)	26	97	12.7
APR	12	95 (+46)	15	55	9.7
MAY	7	112 (+58)	19	61	9.1
JUNE	0	32 (-25)	13	1	6.5
JULY	0	24 (-38)	6	TRACE	6.2
AUG	2	69 (+4)	13	9	6.4
SEPT	7	19 (-42)	7	TRACE	7.5
OCT	9	86 (+13)	16	44	6.6
NOV	18	57 (-14)	21	41	9.1
DEC	15	134 (+68)	23	109	12.3
YEAR*	142	909(+188)	192	541	8.8

(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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79/E/1

METEOROLOGICAL RECORDS 1979 - WOBURN

(Departure from long-period means in brackets)

MONTH	Total sunshine: hours	Mean temperature:C Air(1)	Dew point	In ground under grass 30 cm	100 cm	Ground(2) frosts	Total rainfall:mm 12.7 cm (5in) gauge	Rain(3) days	Wind(4) km per hour
JAN	52 (+2)	-0.8 (-4.1)	-1.8	2.7	6.1	26	60 (+6)	18	8.0
FEB	46 (-18)	0.7 (-2.7)	-0.8	2.0	4.5	25	51 (+10)	13	7.7
MAR	90 (-25)	4.5 (-0.8)	2.4	4.2	4.8	19	127 (+84)	23	13.1
APR	93 (-48)	7.7 (-0.2)	5.3	7.3	6.3	14	87 (+42)	21	7.8
MAY	184 (+1)	10.6 (-0.4)	7.5	10.6	8.6	7	103 (+50)	20	9.6
JUNE	151 (-48)	13.4 (-0.8)	11.7	14.9	11.6	0	43 (-7)	9	6.7
JULY	169 (-11)	16.0 (+0.0)	14.6	16.5	13.8	0	14 (-40)	6	7.4
AUG	157 (-15)	15.3 (-0.5)	14.2	16.1	14.6	1	70 (+9)	13	7.8
SEPT	159 (+25)	13.5 (-0.1)	12.7	14.5	14.2	8	15 (-37)	5	8.5
OCT	109 (+8)	10.7 (+0.7)	10.3	11.9	12.9	8	81 (+28)	13	5.7
NOV	61 (+0)	6.5 (+0.2)	5.7	7.8	10.4	11	46 (-17)	19	10.1
DEC	44 (+0)	5.6 (+1.6)	4.0	6.7	8.9	14	131 (+78)	24	12.9
YEAR*	1315(-129)	8.6 (-0.6)	7.1	9.6	9.7	133	828 (+206)	184	8.8

METEOROLOGICAL RECORDS 1979 - SAXMUNDHAM

MONTH	Mean temperature: C Air(1)	Dew point	In ground under bare soil 30 cm	Ground(2) frosts	Total rainfall :mm 12.7 cm (5 in) gauge	Rain(3) days	Wind(4) km per hour
JAN	0.1 (-4.5)	0.0	2.2	21	88 (+30)	14	12.4
FEB	2.1 (-1.8)	0.0	1.9	17	89 (+48)	8	12.7
MAR	5.0 (-0.2)	2.8	4.3	12	63 (+21)	16	15.8
APR	7.6 (+0.6)	5.0	7.3	9	52 (+16)	12	11.3
MAY	11.0 (+0.4)	7.8	11.1	9	68 (+30)	11	11.5
JUNE	14.3 (+0.5)	11.7	16.3	0	33 (-5)	10	7.2
JULY	17.0 (+1.0)	11.7	17.7	0	27 (-26)	7	7.3
AUG	15.8 (-0.5)	11.7	16.3	1	61 (+17)	12	8.0
SEPT	14.6 (+0.6)	10.5	15.3	4	26 (-39)	4	9.5
OCT	11.9 (+1.1)	10.5	12.2	5	25 (-13)	8	10.0
NOV	6.5 (-0.0)	5.0	6.8	14	48 (-31)	13	10.7
DEC	6.0 (+1.2)	3.3	6.2	16	96 (+46)	15	15.0
YEAR*	9.3 (-0.1)	6.7	9.8	108	676 (+94)	130	11.0

(1)Mean of maximum and minimum
(2)Number of nights grass min. was below 0.0 C
(3)Number of days rainfall was 0.2 mm or more
(4)At 2 metres above ground level

*Mean or total

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (yd²)	= 0·8361 m²
1 acre (ac) (=4840 yd²)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes) (t)
1 pint	= 0·5682 litre (l)
1 gallon (gal) (=8 pints)	= 4·546 litres
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litres

To convert	*Multiply by*
oz ac^{-1} to g ha^{-1}	70·06
lb ac^{-1} to kg ha^{-1}	1·121
cwt ac^{-1} to kg ha^{-1}	125·5
cwt ac^{-1} to t ha^{-1}	0·1255
ton ac^{-1} to kg ha^{-1}	2511
ton ac^{-1} to t ha^{-1}	2·511
gal ac^{-1} to l ha^{-1}	11·233

The following factors are accurate to about 2 parts in 100:

1 lb ac^{-1} = 1·1 kg ha^{-1}
1 gal ac^{-1} = 11 litres ha^{-1}
1 ton ac^{-1} = 2·5 t ha^{-1}

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0·5 kg
1 lb ac^{-1} = 1 kg ha^{-1}

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

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CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (m^2)	=	1·196 square yards (yd^2)
1 hectare (ha)	=	2·471 acres (ac)
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne) (t)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35·20 fluid ounces = 0·03531 cubic foot (ft^3)

To convert	*Multiply by*
g ha^{-1} to oz ac^{-1}	0·01427
kg ha^{-1} to lb ac^{-1}	0·8921
kg ha^{-1} to cwt ac^{-1}	0·007966
t ha^{-1} to cwt ac^{-1}	7·966
kg ha^{-1} to tons ac^{-1}	0·0003983
t ha^{-1} to tons ac^{-1}	0·3983
l ha^{-1} to gal ac^{-1}	0·08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P_2O_5, K_2O, Na_2O, CaO, MgO, SO_3) is still used in work involving fertilisers and liming since Regulations require statements of P_2O_5, K_2O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3} \times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times K_2O = K$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times CaO = Ca$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	*Multiply by*	*To convert*	*Multiply by*
P_2O_5 to P	0·4364	P to P_2O_5	2·2915
K_2O to K	0·8301	K to K_2O	1·2047
CaO to Ca	0·7146	Ca to CaO	1·3994
MgO to Mg	0·6031	Mg to MgO	1·6581

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