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Yields of the Field Experiments 1975

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Rotations

Rothamsted Research

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75/R/RN/1 and 75/R/RN/2

LDN/ARABLE

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

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

The 27th year, old grass, leys, oats, wheat.

For previous years see 'Details' 1967, 68/B/1(t), 69/R/RN/1&2(t), 70/R/RN/1&2(t), 71/R/RN/1&2(t) and 72-74/R/RN/1&2.

The experiment is duplicated on:-

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

HIGHFIELD

A site with little organic matter initially

FOSTERS

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

ROTATION

Treatment crops	Test crops	
IU, IU, IU,	W, P, B	LUCERNE
IC, IC, IC,	W, P, B	CLOVER
LN, LN, LN,	W, P, B	GRASS
H, SB, O,	W, P, B	ARABLE

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

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

In 1975 the barley test crop was changed to wheat.

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

RESEDED

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

OLDGRASS

75/R/RN/1 and 75/R/RN/2

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

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

In 1975 the all-grass half plots of the reseeded grass plots were used for a new experiment (see 75/R/CS/169).

From 1968 only two phases on each field have continued in the original six-course rotation. All other phases have been sown to wheat every year at the end of the test-crop cycle. In 1975:-

Wheat, 7th test crop, 6th cereal (P,W,B,W,W,W,W)	CEREAL 6
Wheat, 8th test crop, 7th cereal (P,W,B,W,W,W,W,W)	CEREAL 7
Wheat, 10th test crop, 8th cereal (W,P,B,W,W,W,W,W,W)	CEREAL 8
Wheat, 11th test crop, 9th cereal (W,P,B,W,W,W,W,W,W,W)	CEREAL 9

Treatments to 7th-11th test crops wheat:-

Sub plots: Nitrogen fertiliser (kg N) in 1975:- N 75

75	75
126	126
176	176
225	225

Treatments to 3rd test crop wheat (2nd cereal P,W,W):-

Sub plots: Farmyard manure residues, last applied 1968:- FYMRES68

None	NONE
30 tonnes on each occasion	FYM

Sub sub plots: Residues of nitrogen fertiliser applied to potatoes 1973 (kg N):- N(73)

None	0
80	80
160	160
240	240

Sub sub plots: Residues of nitrogen fertiliser applied to wheat 1974 (kg N):- N(74)

None	0
50	50
100	100
150	150

75/R/N/1 and 75/R/N/2

Sub sub plots: Nitrogen fertiliser in 1975 (kg N):-

N 75

None	0
75	75
150	150
225	225

Standard applications:

3rd Treatment crops:

All-grass ley: Manures: 75 kg P2O5, 150 kg K2O as (0:14:28) in winter. 75 kg N, 48 kg K2O as (25:0:16) for each cut.

Clover-grass ley: Manures: 75 kg P2O5, 150 kg K2O as (0:14:28) in winter. 48 kg K2O as muriate of potash for each cut.

Lucerne: Manures: 115 kg P2O5, 230 kg K2O as (0:14:28) in winter.

Oats: Manures: 50 kg N, 50 kg P2O5, 77 kg K2O as (13:13:20) combine drilled. Weedkiller: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l).

3rd, 7th, 8th, 10th and 11th Test crops:

Winter wheat: Manures: 75 kg P2O5 and 75 kg K2O as (0:20:20), combine drilled. Weedkillers: Mecoprop ('Compitox Extra' at 4.2 l in 220 l).

On Fosters all wheat, on Highfield 3rd test crop only - paraquat at 0.56 kg ion in 220 l, remaining wheat on Highfield 0.84 kg ion in 220 l.

Reseeded grass and Old grass: Manures: 75 kg P2O5 and 150 kg K2O as (0:14:28) in winter.

All-grass half plots: (excluding Reseeded grass): Manures: 75 kg N and 48 kg K2O as (25:0:16) for each cut.

Clover-grass half plots: 48 kg K2O as muriate of potash for each cut.

Seed: Wheat: Cappelle, sown at 200 kg.

Oats: Manod, sown at 200 kg.

Cultivations, etc.:-

3rd year Treatment crops:

All grass ley: PK applied: 15 Jan, 1975. NK applied: 5 Mar, 4 June, 18 Aug. Cut three times: 28 May, 31 July, 10 Nov.

Clover grass ley: PK applied: 15 Jan, 1975. K applied: 5 Mar, 4 June, 18 Aug. Cut three times: 28 May, 31 July, 10 Nov.

Lucerne: PK applied: 15 Jan, 1975. Cut three times: 10 June, 23 July, 10 Nov.

Oats: Ploughed: 17 Jan, 1975. Rotary cultivated and seed sown:

25 Mar. Weedkiller applied: 20 May. Combine harvested: 18 Aug.

75/R/RN/1 and 75/R/RN/2

Test crops: Winter wheat (7th to 11th test crops):

Paraquat applied: 30 Sept, 1974. Ploughed: 11 Oct. Rotary cultivated: 14 Oct. Drilled: Fosters: 15 Oct, Highfield: 30 Oct. N applied: 22 Apr, 1975. Weedkiller applied: 9 May. Combine harvested: 12 Aug.

Winter wheat (3rd test crops):

Paraquat applied: Block 3, Fosters: 30 Sept, 1974. Block 1 Fosters and Blocks 1 and 4 Highfield: 14 Oct. Ploughed: 15 Oct. Rotary cultivated: 28 Oct. Seed sown: 31 Oct. N applied: 22 Apr, 1975. Weedkiller applied: 9 May. Combine harvested: 11 Aug.

Reseeded and Old grass (excluding all-grass half plots of reseeded grass): PK applied: 15 Jan, 1975. NK applied to all-grass half plots and K to clover-grass half-plots: 5 Mar, 4 June and 18 Aug. Cut three times: 28 May, 31 July, 10 Nov.

75/R/RN/1 AND 75/R/RN/2

WHEAT 3RD TEST CROP CEREAL 2

GRAIN TONNES/HECTARE

HIGHFIELD

*** TABLES OF MEANS***

ROTATION FYMRES (68)	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
NONE	3.98	4.65	4.99	4.69	4.58
FYM	3.99	5.11	5.23	4.83	4.79

N(73)	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
0	3.92	5.06	4.93	4.66	4.66
80	3.88	5.04	5.15	4.86	4.73
160	4.23	4.44	4.82	4.93	4.61
240	3.91	4.97	5.48	4.60	4.74

N(74)	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
0	3.25	4.49	4.81	4.33	4.22
50	3.31	4.69	4.62	4.83	4.49
100	4.18	5.18	5.50	4.79	4.91
150	4.68	5.16	5.50	5.11	5.11

N 75	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
0	2.31	3.59	3.49	2.71	3.02
75	3.96	5.53	4.97	4.75	4.81
150	4.53	4.86	5.92	5.98	5.32
225	5.13	5.53	6.05	5.61	5.58
MEAN	3.98	4.83	5.11	4.76	4.68

GRAIN MEAN DM% 85.9

SUB PLOT AREA HARVESTED 0.00325

75/R/RN/1 AND 75/R/RN/2

WHEAT 3RD TEST CROP CEREAL 2

GRAIN TONNES/HECTARE

FCS TERS

*** TABLES OF MEANS ***

ROTATION FYMRES(68)	LUCERNE	CLOVER	GRASS	ARABLE	MEAN
NONE	5.54	5.36	5.38	5.19	5.37
FYM	6.17	4.94	5.59	5.52	5.55

N(73)	LUCERNE	CLOVER	GRASS	ARABLE	MEAN
0	5.84	5.88	5.69	5.25	5.67
80	5.90	5.03	5.30	5.36	5.40
160	5.55	4.45	5.52	5.63	5.29
240	6.14	5.23	5.43	5.17	5.49

N(74)	LUCERNE	CLOVER	GRASS	ARABLE	MEAN
0	5.53	5.88	5.33	5.04	5.45
50	5.80	4.34	5.50	5.25	5.22
100	5.91	5.30	5.54	5.39	5.54
150	6.18	5.07	5.57	5.72	5.64

N 75	LUCERNE	CLOVER	GRASS	ARABLE	MEAN
0	3.96	4.07	3.84	3.21	3.77
75	6.00	5.12	5.84	5.57	5.63
150	6.77	5.38	6.20	6.14	6.12
225	6.69	6.03	6.06	6.49	6.32
MEAN	5.86	5.15	5.49	5.35	5.46

GRAIN MEAN DM% 85.9

SUB PLOT AREA HARVESTED 0.00325

75/R/RN/1 AND 75/R/RN/2

WHEAT 7TH TEST CROP CEREAL 6

GRAIN TONNES/HECTARE

HIGHFIELD

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE		4.84	5.34	5.85	5.54	5.40
CLOGRA		5.88	6.48	6.68	6.25	6.32
GRASS		5.50	6.18	5.74	5.64	5.77
ARABLE		5.26	6.11	5.67	5.90	5.74
RESEEDED		6.14	6.49	6.70	6.08	6.35
OLDGRASS		6.16	6.34	6.32	5.67	6.12
MEAN		5.63	6.16	6.16	5.86	5.95

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.364	0.188	0.540
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
ROTATION			0.461

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.364	6.1
BLOCK.WP.SP	18	0.461	7.8

GRAIN MEAN DM% 86.8

SUB PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2
 WHEAT 7TH TEST CROP CEREAL 6
 GRAIN TONNES/HECTARE
 FOSTERS

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE	5.02	6.43	7.12	6.97	6.38	6.38
CLOGRA	5.16	5.97	7.03	6.50	6.17	6.17
GRASS	5.05	5.80	6.17	6.74	5.94	5.94
ARABLE	5.04	6.21	6.91	7.03	6.30	6.30
RESEEDED	5.62	6.83	7.23	6.74	6.60	6.60
MEAN	5.18	6.25	6.89	6.80	6.28	6.28

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.235	0.180	0.421
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: ROTATION			0.403

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.235	3.7
BLOCK.WP.SP	15	0.403	6.4

GRAIN MEAN DM% 86.9

PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2

WHEAT 8TH TEST CROP CEREAL 7

GRAIN TONNES/HECTARE

HIGHFIELD

*** TABLES OF MEANS ***

	N75	75	126	176	226	MEAN
ROTATION						
LUCERNE		5.21	6.51	6.57	6.34	6.16
CLOGRA		5.91	6.58	6.81	6.27	6.39
GRASS		5.17	6.22	6.26	6.38	6.01
ARABLE		5.44	6.01	6.85	6.28	6.15
RESEDED		5.69	7.07	6.65	6.60	6.50
OLDGRASS		5.89	6.79	7.17	6.47	6.58
MEAN		5.55	6.53	6.72	6.39	6.30

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.159	0.133	0.324
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: ROTATION			0.326

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.159	2.5
BLOCK.WP.SP	18	0.326	5.2

GRAIN MEAN DM% 86.8

SUB PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2

WHEAT 8TH TEST CROP CEREAL 7

GRAIN TONNES /HECTARE

FCS TERS

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE		5.31	6.23	6.85	6.90	6.32
CLOGRA		4.65	6.35	6.68	6.57	6.06
GRASS		4.48	5.34	6.27	6.78	5.72
ARABLE		4.11	5.77	6.77	6.95	5.90
RESEEDED		5.63	6.72	6.90	7.14	6.60
MEAN		4.84	6.08	6.69	6.87	6.12

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.393	0.151	0.490
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
ROTATION			0.337

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.393	6.4
BLOCK.WP.SP	15	0.337	5.5

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2

WHEAT 10TH TEST CROP CEREAL 8

GRAIN TONNES/HECTARE

HIGHFIELD

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE		5.26	6.50	6.61	6.36	6.18
CLOGRA		5.97	6.58	5.90	5.39	5.96
GRASS		5.28	6.22	6.32	6.43	6.06
ARABLE		5.50	6.01	6.91	6.33	6.19
RESEEDED		5.75	7.09	6.68	6.57	6.52
OLDGRASS		5.96	6.77	6.18	6.51	6.36
MEAN		5.62	6.53	6.44	6.26	6.21

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.255	0.189	0.475
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: ROTATION			0.463

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.255	4.1
BLOCK.WP.SP	18	0.463	7.5

GRAIN MEAN DM% 87.3

SUB PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2

WHEAT 10TH TEST CROP CEREAL 8

GRAIN TONNES/HECTARE

FOSTERS

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE		2.64	3.56	5.45	5.71	4.34
CLOGRA		3.47	4.06	6.11	5.99	4.91
GRASS		3.83	5.52	6.33	6.32	5.51
ARABLE		2.74	5.16	6.25	6.09	5.06
RESEEDED		3.90	4.71	5.90	6.07	5.15
MEAN		3.32	4.60	6.01	6.04	4.99

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.277	0.210	0.493
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
ROTATION			0.470

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.277	5.6
BLOCK.WP.SP	15	0.470	9.4

GRAIN MEAN DM% 87.3

PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2

WHEAT 11TH TEST CROP CEREAL 9

GRAIN TONNES/HECTARE

HIGHFIELD

*** TABLES OF MEANS ***

	N75	75	126	176	226	MEAN
ROTATION						
LUCERNE		4.24	5.19	5.87	5.83	5.28
CLOGRA		4.57	5.53	5.88	5.57	5.39
GRASS		4.69	5.56	5.72	5.58	5.39
ARABLE		4.50	5.56	6.11	5.60	5.44
RESEDED		5.39	6.26	6.67	6.58	6.23
OLDGRASS		5.60	6.34	6.58	6.34	6.22
MEAN		4.83	5.74	6.14	5.92	5.66

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.451	0.139	0.539
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: ROTATION			0.341

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.451	8.0
BLOCK.WP.SP	18	0.341	6.0

GRAIN MEAN DM% 86.7

SUB PLOT AREA HARVESTED 0.00663

75/R/RN/1 AND 75/R/RN/2
 WHEAT 11TH TEST CROP CEREAL 9
 GRAIN TONNES/HECTARE
 FOSTERS

*** TABLES OF MEANS ***

	N75	75	126	176	225	MEAN
ROTATION						
LUCERNE		4.35	4.75	5.11	7.08	5.32
CLOGRA		4.10	4.73	5.00	5.92	4.94
GRASS		4.11	5.16	6.35	6.57	5.55
ARABLE		4.11	4.71	5.77	6.53	5.28
RESEEDED		4.96	5.84	6.86	7.00	6.17
MEAN		4.33	5.04	5.82	6.62	5.45

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

TABLE	ROTATION	N75	ROTATION N75
SED	0.379	0.309	1.063
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: ROTATION			0.691

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.879	16.1
BLOCK.WP.SP	15	0.691	12.7

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00663

75/R/RN/1 and 75/R/RN/2

DRY MATTER: TONNES/HECTARE

OLD GRASS

TOTAL OF 3 CUTS

C N

HIGHFIELD

27th Exptl year

Blocks 1 & 4

Block 2

3.06

2.84

7.50

8.81

SPRING OATS

TONNES/HECTARE

HIGHFIELD

GRAIN

STRAW

3.08

3.21

Mean D.M. %

86.8

91.8

FOSTERS

GRAIN

STRAW

2.88

3.46

Mean D.M. %

86.8

94.2

75/R/RN/1 and 75/R/RN/2

DRY MATTER: TONNES/HECTARE

	HIGHFIELD Mean		FOSTERS Mean	
LUCERNE				
TOTAL OF 3 CUTS				
3rd year	10.69		13.67	
ALL GRASS LEY				
TOTAL OF 3 CUTS				
3rd year	6.97		6.71	
CICVER-GRASS LEY				
TOTAL OF 3 CUTS				
3rd year	4.98		4.42	
RESEEDED GRASS				
TOTAL OF 3 CUTS				
	HIGHFIELD		FOSTERS	
	Blocks	RC	Blocks	RC
27th Exptl year	1 & 4	3.03	1 & 3	4.20
27th Exptl year (Seeded 1949 Reseeded 1973)	2 & 3	5.46	2 & 4	5.18

75/W/RN/3

LEY/ARABLE

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

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

The 38th year, leys, barley, potatoes, wheat.

For previous years see 'Details' 1967, 68/B/2(t), 69/W/RN/3(t), 70/W/RN/3(t), 71/W/RN/3(t), 72/W/RN/3(t) and 73-74/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 are present:		ROTATION
Grass/clover ley:	L, L, L, P, W	LEY
All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W	SAINFOIN CLOVER
Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W	ARABLE
Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W	ARABLE H

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

Additional treatments to first test crop, potatoes:-

1/2 plots:	1. Farmyard manure residues, last applied 1965:-	FYMRES65
	None	NONE
	38 tonnes on each occasion	FYM
1/4 plots:	2. Fumigant applied in 1975:-	FUM75
	None	NONE
	Dichloropropene, 220 kg, plus aldicarb, 11.2 kg	DICHL/AL

75/W/RN/3

Additional treatments to second test crop, winter wheat:-

1/2 plots	1. Farmyard manure residues, last applied 1964:-	FYMRES6L
	None	NONE
	38 tonnes on each occasion	FYM
1/4 plots	2. Fumigant residues, applied 1974:-	FUMRES74
	None	NONE
	Dichloropropene, 220 kg, plus aldicarb, 6.7 kg	DICHL/AL
1/8 plots	3. Nitrogen fertilisers (kg N) in 1975:-	N75
	None	0
	63	63
	126	126
	189	189

Additional treatments to first treatment crop, potatoes:-

1/2 plots	1. Farmyard manure residues, last applied 1963:-	FYMRES63
	None	NONE
	38 tonnes on each occasion	FYM
1/4 plots (A,AH only)	All combinations of:-	
	2. Fumigant residues, applied 1973:-	FUMRES73
	None	NONE
	Chloropicrin, 448 kg, plus aldicarb, 6.7 kg	CHLOR/AJ
	3. Fumigant applied in 1975 (cumulative to chloropicrin 1970):-	FUM75(70)
	None	NONE
	Dichloropropene, 220 kg, plus aldicarb, 11.2 kg	DICHL/AL
1/4 plots (L,S only)	All combinations of:-	
	2. Fumigant residues, applied 1973:-	FUMRES73
	None	NONE
	Chloropicrin, 448 kg, plus aldicarb, 6.7 kg	CHLOR/AL

75/W/RN/3

	3. Fumigant applied in 1975:-	FUM75
	None	NONE
	Dichloropropene, 220 kg, plus aldicarb, 11.2 kg	DICHL/AL
Additional treatments to second treatment crop, barley:-		
1/2 plots	1. Farmyard manure residues, last applied 1967	FYMRES67
	None	NONE
	38 tonnes on each occasion	FYM
1/8 plots (A, AH only)	2. Fumigant residues, applied 1972:-	FUMRES72
	None	NONE
	Chloropicrin, 448 kg, plus aldicarb, 11.2 kg	CHLOR/AL
1/4 plots	3. Fumigant residues, applied 1974:-	FUMRES74
	None	NONE
	Dichloropropene, 224 kg, plus aldicarb, 6.7 kg	DICHL/AL
Additional treatments to third treatment crop, barley:-		
1/2 plots	1. Farmyard manure residues, last applied 1966:-	FYMRES66
	None	NONE
	38 tonnes on each occasion	FYM
1/8 plots	2. Fumigant residues, applied 1971:-	FUMRES71
	None	NONE
	Chloropicrin, 448 kg, plus aldicarb, 11.2 kg	CHLOR/AL
1/4 plots (except S, L)	3. Fumigant residues, applied 1973:-	FUMRES73
	None	NONE
	Chloropicrin, 448 kg, plus aldicarb, 6.7 kg	CHLOR/AL
Corrective K dressings (in kg K ₂ O) as muriate of potash applied to first test crop, potatoes:-		

75/W/FN/3

Continuous rotations	No FYM	FYM
	half plots	half plots
Ley	176	50
Clover	201	264
Arable with hay	63	0
Arable	75	138
Alternating rotations (last two rotations in order)		
Ley/arable	63	163
Sainfoin/arable with hay	151	138
Arable with hay/clover	213	238
Arable/ley	151	188

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

Standard applications:-

Winter wheat: Manures: Magnesian limestone at 5 tonnes. (0:20:20) at 290 kg, combine drilled. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 280 l.

Barley: Manures: 2nd and 3rd treatment crops: (15:15:15) at 410 kg, combine drilled. Weedkillers: 3rd treatment crop only: Ioxynil at 0.52 kg plus mecoprop at 1.6 kg in 280 l.

Potatoes: Manures: Test and treatment crops: (13:13:20) at 1940 kg. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.28 kg ion in 280 l. Treatment crop only: Paraquat at 0.56 kg ion in 280 l. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l. Fungicide: Mancozeb at 1.3 kg 390 l.

Hay: Manures: N at 130 kg, as 'Nitro-Chalk', plus (0:14:28) at 540 kg in spring. (25:0:16) at 270 kg after the first cut.

Ley, 1st year: Manures: N at 50 kg as 'Nitro-Chalk', P205 at 190 kg as superphosphate, K20 at 130 kg as muriate of potash in the seedbed. Weedkiller: Paraquat at 0.56 kg ion in 280 l.

Leys, 2nd and 3rd years: Manures: (25:0:16) at 360 kg for each cut.

Clover, 1st year: Manures: N at 60 kg as 'Nitro-Chalk', P205 at 190 kg as superphosphate, K20 at 130 kg as muriate of potash. Weedkiller: Paraquat at 0.56 kg ion in 280 l.

Clover, 2nd and 3rd years: Manures: N at 60 kg as 'Nitro-Chalk', K20 at 190 kg as muriate of potash. Weedkiller 3rd year only: Paraquat at 0.84 kg ion in 280 l.

Varieties: Winter wheat: Cappelle, dressed with dieldrin, sown at 200 kg

Barley: Julia, dressed with ethirimol, sown at 160 kg

Potatoes: First test and treatment crops: Maris Piper

Red Clover: 1st year: S123, sown at 45 kg

Red Clover: 3rd year resown: S123, sown at 40 kg

Ley: 1st year: Perennial ryegrass S23, Cocksfoot S143, late flowering red clover, Alsike clover, sown at 30 kg.

75/W/FN/3

Cultivations, etc.:- Treatment crops:

Ley, 1st year: Paraquat applied: 11 Sept, 1974. Subsoiled: Tines 140 cm apart and 56 cm deep: 17 Sept. Ploughed: 31 Oct. Spring-tine cultivated three times: 6 Nov, 24 Apr, 1975, 28 Apr. Rolled, N, P and K applied: 30 Apr. Seeds sown, harrowed in: 2 May. Rolled: 4 May. Topped four times: 8 June, 1 Aug, 2 Sept, 31 Oct.

Ley, 2nd and 3rd years: NK applied: 6 Mar, 1975, 27 June. Cut once: 23 June. 2nd year ley topped: 9 Sept, 31 Oct and 3rd year ley: 2 Sept.

Clover, 1st year: Paraquat applied: 11 Sept, 1974. Subsoiled: Tines 140 cm apart and 56 cm deep: 17 Sept. Ploughed: 31 Oct. Spring-tine cultivated three times: 6 Nov, 24 Apr, 1975, 28 Apr. Rolled, N, P and K applied: 30 Apr. Seed sown, harrowed in: 2 May. Rolled: 4 May. Topped four times: 8 June, 1 Aug, 2 Sept, 31 Oct.

Clover, 2nd year: N and K applied: 6 Mar, 1975. Cut twice: 23 June, 28 Aug.

Clover, 3rd year: N and K applied: 6 Mar, 1975. Cut and carted off weeds, paraquat applied: 22 May. Rotary cultivated: 27 May. Power harrowed, red clover resown, harrowed in, rolled: 6 June. Weeds pulled by hand: 23 June. Topped: 5 Aug, 2 Sept.

Seeds Hay: Seeds undersown in barley: 30 Apr, 1974. N and PK applied: 6 Mar, 1975. Cut: 23 June. NK applied: 27 June.

Potatoes, 1st treatment crop: Paraquat applied: 11 Sept, 1974. Subsoiled: Tines 140 cm apart and 56 cm deep: 17 Sept. Ploughed: 31 Oct. Spring-tine cultivated: 6 Nov. Deep-tine cultivated: 6 Jan, 1975. Dichloropropene applied, spring-tine cultivated: 8 Jan. NPK applied: 21 Apr. Deep-tine cultivated: 25 Apr. Spring-tine cultivated: 28 Apr. Aldicarb applied, all plots rotary cultivated, potatoes planted: 5 May. Ridges rolled: 10 May. Linuron and paraquat applied: 22 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied: 25 June. Fungicide applied: 15 July. Haulm mechanically destroyed: 26 Sept. Sprayed with undiluted BOV at 160 l. Lifted: 7 Oct.

Barley, 2nd treatment crop: Deep-tine cultivated twice: 31 Dec, 1974, 6 Jan, 1975. Spring-tine cultivated three times, the second time with crumbler: 26 Feb, 21 Mar, 26 Mar. Seed sown: 26 Mar. Spring-tine cultivated with crumbler, seed resown, seeds hay undersown (Arable H plots), covered in, rolled: 1 May. Thistles hoed by hand: 17 July. Combine harvested: 23 July.

Barley, 3rd treatment crop: Ploughed: 17 Dec, 1974. Spring-tine cultivated three times, the second time with crumbler: 26 Feb, 21 Mar, 26 Mar. Seed sown: 26 Mar. Spring-tine cultivated with crumbler, seed resown, rolled: 1 May. Weedkiller applied: 5 June. Combine harvested: 19 Aug.

Test Crops:

Potatoes, 1st test crop: First half corrective K applied: 9 Oct, 1974. Rotary cultivated: 30 Oct. Ploughed: 31 Oct. Spring-tine cultivated: 6 Nov. Deep-tine cultivated: 6 Jan, 1975. Dichloropropene applied, spring-tine cultivated: 8 Jan. Second half corrective K applied: 21 Feb. NPK applied: 22 Apr. Deep-tine cultivated: 25 Apr. Spring-tine cultivated: 28 Apr. Aldicarb applied, all plots rotary cultivated, potatoes planted: 5 May. Ridges rolled: 10 May. Weedkiller applied: 22 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied:

75/W/RN/3

25 June. Fungicide applied: 15 July. Haulm mechanically destroyed:
26 Sept. Sprayed with undiluted BOV at 160 l: 2 Oct. Lifted: 6 Oct.
Wheat, 2nd test crop: Magnesian limestone applied, deep-tine cultivated
twice: 7 Nov, 1974. Spring-tine cultivated, seed sown: 8 Nov.
N applied: 26 Mar, 1975. Harrowed: 22 Apr. Rolled: 24 Apr.
Weedkiller applied: 8 May. Combine harvested: 12 Aug.

75/W/RN/3

WHEAT 2ND TEST CROP

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	LEY	CLOVER	ARABLE	ARABLEH	MEAN
FYMRES64					
NONE	3.63	3.51	2.92	3.14	3.30
FYM	3.47	3.52	2.78	3.07	3.24
FUMRES74					
NONE	3.45	3.35	2.47	2.84	3.03
DICHL/AL	3.66	3.78	3.23	3.37	3.51
N75					
0	2.54	2.34	1.31	1.69	1.97
63	4.15	3.87	3.00	3.48	3.62
126	4.10	4.11	4.04	3.83	4.02
189	3.43	3.95	3.05	3.43	3.47
MEAN	3.55	3.57	2.85	3.11	3.27

GRAIN MEAN DM% 88.3

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	LEY	CLOVER	ARABLE	ARABLEH	MEAN
FYMRES64					
NONE	4.51	4.56	3.21	3.45	3.93
FYM	4.69	4.82	3.02	3.65	4.05
FUMRES74					
NONE	4.39	4.42	2.45	3.32	3.64
DICHL/AL	4.31	4.96	3.78	3.78	4.33
N75					
0	1.80	1.83	0.91	1.32	1.46
63	4.44	4.40	3.15	3.61	3.90
126	5.87	5.93	4.18	4.53	5.12
189	6.30	6.60	4.22	4.76	5.47
MEAN	4.60	4.69	3.11	3.55	3.99

STRAW MEAN DM% 93.8

SUB PLOT AREA HARVESTED 0.00260

75/W/RN/3

BARLEY 2ND TREATMENT CROP

ARABLE AND ARABLE H

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	ARABLE	ARABLEH	MEAN
FYMRES67			
NONE	2.01	2.53	2.27
FYM	2.30	2.43	2.37
FUMRES72			
NONE	2.19	2.42	2.30
CHLOR/AL	2.12	2.54	2.33
FUMRES74			
NONE	2.07	2.43	2.25
DICHL/AL	2.25	2.52	2.39
MEAN	2.16	2.48	2.32

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	ARABLE	ARABLEH	MEAN
FYMRES67			
NONE	1.40	1.94	1.67
FYM	1.55	1.70	1.63
FUMRES72			
NONE	1.51	1.71	1.61
CHLOR/AL	1.43	1.93	1.68
FUMRES74			
NONE	1.40	1.80	1.60
DICHL/AL	1.55	1.84	1.69
MEAN	1.47	1.82	1.65

STRAW MEAN DM% 87.8

PLOT AREA HARVESTED 0.00260

75/W/RN/3

BARLEY 2ND TREATMENT CROP

LEY AND SANFOIN

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	LEY	SAINFOIN	MEAN
FYMRES67			
NONE	2.30	2.00	2.15
FYM	2.39	2.43	2.41
FUMRES74			
NONE	2.20	2.11	2.15
DICHL/AL	2.49	2.32	2.41
MEAN	2.35	2.22	2.28

GRAIN MEAN DM% 84.1

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	LEY	SAINFOIN	MEAN
FYMRES67			
NONE	1.38	1.60	1.49
FYM	1.37	1.79	1.83
FUMRES74			
NONE	1.35	1.59	1.47
DICHL/AL	1.90	1.79	1.85
MEAN	1.63	1.69	1.66

STRAW MEAN DM% 87.4

PLOT AREA HARVESTED 0.00559

75/W/RN/3

BARLEY 3RD TREATMENT CROP

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	ARABLE	SAINFOIN	MEAN
FYMRES66			
NONE	1.73	1.34	1.53
FYM	1.73	2.09	1.93
FUMRES71			
NONE	1.79	1.86	1.82
CHLOR/AL	1.72	1.57	1.64
FUMRES73			
NONE	1.78	1.76	1.77
CHLOR/AL	1.73	1.66	1.70
MEAN	1.75	1.71	1.73

GRAIN MEAN DM% 83.0

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	ARABLE	SAINFOIN	MEAN
FYMRES66			
NONE	1.52	1.76	1.64
FYM	1.64	2.56	2.10
FUMRES71			
NONE	1.63	2.40	2.01
CHLOR/AL	1.52	1.92	1.72
FUMRES73			
NONE	1.62	2.26	1.94
CHLOR/AL	1.53	2.05	1.79
MEAN	1.58	2.16	1.87

STRAW MEAN DM% 85.2

PLOT AREA HARVESTED 0.00260

75/W/RN/3

POTATOES 1ST TEST CROP

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION TYPE	LEY	CLOVER	ARABLE	ARABLEH	MEAN
PERM	36.5	38.1	13.6	25.2	28.4
ALT	32.3	32.3	23.5	27.6	28.9
FYMRES65					
NONE	33.3	36.1	16.6	26.7	28.3
FYM	35.0	34.3	20.4	26.2	29.0
FUM75					
NONE	29.4	28.6	14.8	18.3	22.8
DICHL/AL	39.3	41.8	22.2	34.6	34.5
MEAN	34.4	35.2	18.5	26.4	28.6

PERCENTAGE WARE 3.81 (1.5 CM) RIDDLE

*** TABLES OF MEANS ***

ROTATION TYPE	LEY	CLOVER	ARABLE	ARABLEH	MEAN
PERM	91.2	93.7	73.6	83.7	85.5
ALT	91.1	90.3	83.5	90.4	89.0
FYMRES65					
NONE	90.6	91.9	78.8	87.6	87.2
FYM	91.7	92.6	78.4	85.5	87.3
FUM75					
NONE	89.3	89.3	72.6	81.3	83.4
DICHL/AL	92.4	94.6	84.6	92.8	91.1
MEAN	91.1	92.2	78.6	87.1	87.3

PLOT AREA HARVESTED 0.00280

75/W/RN/3

POTATOES 1ST TREATMENT CROP

ARABLE AND ARABLE H PLOTS

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	ARABLE	ARABLEH	MEAN
FYMRES63			
NONE	12.2	10.1	11.1
FYM	13.6	10.5	12.1
FUMRES73			
NONE	13.0	9.3	11.1
CHLOR/AL	12.7	11.4	12.1
FUM75(70)			
NONE	10.7	8.4	9.6
DICHL/AL	15.0	12.2	13.6
MEAN	12.9	10.3	11.6

PERCENTAGE WARE 3.31 CM (1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

ROTATION	ARABLE	ARABLEH	MEAN
FYMRES63			
NONE	93.8	93.1	93.4
FYM	94.8	90.6	92.7
FUMRES73			
NONE	93.9	90.0	91.9
CHLOR/AL	94.8	93.7	94.2
MEAN	94.3	91.8	93.1
FUM75(70)			
NONE	94.6	89.5	92.0
DICHL/AL	94.1	94.2	94.1
MEAN	94.3	91.8	93.1

PLOT AREA HARVESTED 0.00280

75/W/RN/3

POTATOES 1ST TREATMENT CROP

LEY AND SAINFOIN PLOTS

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

ROTATION	LEY	SAINFOIN	MEAN
FYMRES63			
NONE	12.8	12.7	12.8
FYM	14.6	11.2	12.9
FUMRES73			
NONE	13.4	12.0	12.7
CHLOR/AL	14.1	11.9	13.0
FUM75			
NONE	11.3	8.9	10.1
DICHL/AL	16.1	15.1	15.6
MEAN	13.7	12.0	12.8

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

ROTATION	LEY	SAINFOIN	MEAN
FYMRES63			
NONE	93.5	94.7	94.1
FYM	94.4	94.4	94.4
FUMRES73			
NONE	93.6	94.5	94.1
CHLOR/AL	94.2	94.6	94.4
FUM75			
NONE	92.9	93.7	93.3
DICHL/AL	95.0	95.4	95.2
MEAN	93.9	94.5	94.2

PLOT AREA HARVESTED 0.00280

75/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 34th year, ryegrass.

For previous years see 'Details' 1967, 68/D/4(t), 68/W/RN/4, 70/W/RN/4(t), 71/W/RN/4(t), 72/W/RN/4(t) and 73-74/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: 70 kg N as 'Nitro-Chalk' in spring and after the first cut.

Seed: RVP Italian Ryegrass at 40 kg.

Cultivations, etc.: - Both series.

Deep-tine cultivated: 18 July., 1974. Spring-tine cultivated twice: 22 Aug, 16 Sept. Seed sown: 16 Sept. N applied: 19 Mar, 1975, 25 June. Cut twice: 11 June, 27 Aug.

75/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 20th year of the rotation, barley, ley, potatoes, winter wheat, kale. The 16th year of the same rotation on the additional plots. The 19th 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 69-74/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:

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

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

P: 63 kg P₂O₅ as superphosphate

K: 250 kg K₂O as muriate of potash

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

NOTE: Potatoes on the original plots test, on sub plots: 0 v. Mg (82 kg MgO as Epsom salts). Untreated sub plots receive 82 kg MgO after potato harvest.

75/R/RN/5

Additional plots:	MANURE
None	O
N2 PK	F
N2 PK Mg Ca	FMGCA
N2 PK Mg S	FMGS
N2 PK Ca S	FCAS
N2 PK Mg Ca S	FMGCAS
N2 PK Mg Ca S TE	FMGCASTE

F: N2PK
N2: rates as above, applied as urea
P: 126 kg P2O5 as potassium dihydrogen phosphate
K: 83 kg K2O as potassium sulphate to S plots: 93 kg K2O as potassium chloride to the remainder
Mg: 126 kg MgO as magnesium chloride
Ca: 126 kg CaO as calcium carbonate
S: 30 kg S applied by potassium sulphate
TE: Trace element mixture including Mn, Cu, Zn, B, Mo, Ca, Fe. Test varies with crop

Standard applications:

Winter wheat and barley: Weedkillers: Ioxynil with mecoprop ('Atril C' at 5.6 l in 450 l).
Potatoes: Weedkillers: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 280 l. Insecticide: Menazon at 0.28 kg in 280 l on two occasions. Fungicide: Mancozeb at 1.3 kg in 280 l sprayed with insecticide on two occasions.

Seed:

Winter wheat: Maris Nimrod (Maris Fundin on additional plots) both sown at 210 kg.
Barley: Maris Mink, dressed with ethirimol, sown at 200 kg.
Potatoes: King Edward.
Kale: Thousand Headed.
Grass-clover ley: RVP Italian Ryegrass and Hungaropoly Red Clover.

Cultivations, etc.:-

Winter wheat: Balancing Mg applied to half plots: 9 Sept, 1974. Dug by hand: 11 Sept. P, K, Mg, Ca and S applied: 12 Sept. Seed sown: 24 Oct. Weedkiller, trace elements and first half N dressing applied: 16 Apr, 1975. Second half N dressing and all N to additional plots applied: 8 May. Harvested: 11 Aug.
Barley: Dug by hand: 2 Dec, 1974. P, K, Mg, Ca and S applied: 24 Feb, 1975. Rotary cultivated, N applied and seed sown: 26 Mar. Weedkiller applied: 19 May. Trace elements applied: 23 June. Harvested: 11 Aug.

75/R/RN/5

Kale: FYM applied and all plots dug by hand: 29 Nov, 1974. P, K, Mg, Ca and S applied: 24 Feb, 1975. Rotary cultivated and seed sown: 21 Apr.

All N applied to original plots and first half N to additional plots: 16 May. Second half N to additional plots applied: 12 June. Trace elements applied: 23 June. Harvested: 24 Oct.

Potatoes: FYM applied and all plots dug by hand: 29 Nov, 1974. P, K, Mg, Ca and S applied: 24 Feb, 1975. All N applied to original plots and half N

to additional plots and rotary cultivated, Mg applied to half plots of main experiment and potatoes planted: 8 May. Weedkillers applied: 4 June. Second half of N applied to additional plots: 12 June.

Trace elements applied: 23 June. Fungicide with insecticide applied: 18 July and 7 Aug. Plots of the main experiment with neither K nor

FYM and the no-fertiliser plot of the additional plots lifted: 10 Sept. Remaining plots lifted: 26 Sept.

Grass-clover ley: Seed sown: 15 Sept, 1974. P, K, Mg, Ca and S applied: 3 Dec. N applied: 17 Mar, 1975. Trace elements applied: 16 Apr.

Cut four times: 19 May, 14 July, 3 Sept, 17 Oct.

Permanent grass: P and K applied: 3 Dec, 1974. FYM applied:

17 Mar, 1975. N applied: 17 Mar, 19 May, 14 July. Cut three times: 19 May, 14 July, 17 Oct.

75/R/RN/5

TABLES OF MEANS

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

LEY: DRY MATTER

	WINTER WHEAT:		KALE:		BARLEY:		1ST CUT	2ND CUT	3RD CUT	4TH CUT	TOTAL OF 4 CUTS
	GRAIN	STRAW	FRESH WEIGHT	GRAIN	STRAW	GRAIN					
MANURE											
O	3.33	4.18	4.8	3.11	2.27	1.62	1.04	0.34	0.09	3.09	
N1	4.11	6.78	3.5	3.46	2.80	2.98	1.18	0.41	0.12	4.69	
P	4.54	5.27	15.7	2.87	2.27	2.68	1.97	0.78	0.10	5.45	
N1P	4.14	6.89	29.6	2.56	2.05	3.98	1.51	0.38	0.16	6.03	
K	3.86	5.01	5.2	2.93	2.64	2.63	2.13	0.72	0.10	5.58	
N1K	5.89	8.01	3.9	3.95	3.07	3.60	2.13	0.51	0.14	6.38	
PK	4.21	5.33	14.8	3.89	2.72	3.01	3.04	1.03	0.28	7.36	
N1PK	6.06	9.02	30.1	4.59	3.39	3.95	2.55	0.79	0.33	7.62	
N2PK	7.00	10.27	40.1	5.35	4.66	4.85	2.30	0.73	0.22	8.10	
D	5.32	6.56	28.8	4.61	3.41	3.55	2.67	0.94	0.12	7.28	
N1PKD	6.92	9.02	55.4	5.61	4.24	5.17	2.87	0.80	0.18	9.02	
N2PKD	7.39	10.29	69.8	6.06	3.73	5.30	2.46	0.80	0.22	8.78	
MEAN											
DM %	88.5	88.8		86.6	68.4	21.5	33.3	41.1	18.4	28.6	

75/R/RN/5

GREAT FIELD IV (R): ORIGINAL PLCTS

TONNES/HECTARE

	POTATOES:			PERMANENT GRASS:			
	TOTAL TUBERS		MEAN	DRY MATTER			TOTAL OF 3 CUTS
O	MG			1ST CUT	2ND CUT	3RD CUT	
MANURE							
O	6.9	9.6	8.3	0.96	0.34	0.25	1.55
N1	6.2	6.2	6.2	1.52	0.35	0.45	2.32
P	7.3	7.7	7.5	0.85	0.25	0.15	1.25
N1P	5.4	5.8	5.6	2.20	0.22	0.58	3.00
K	17.3	16.5	16.9	1.43	0.43	0.40	2.26
N1K	23.1	23.1	23.1	2.43	0.72	0.83	3.98
PK	23.1	28.8	26.0	1.07	0.64	0.38	2.09
N1PK	31.9	31.9	31.9	2.72	0.63	0.74	4.09
N2PK	25.4	23.8	24.6	3.92	0.73	1.24	5.89
D	30.8	31.9	31.3	3.69	0.54	0.73	4.96
N1PKD	38.4	35.8	37.1	4.34	0.96	1.31	6.61
N2PKD	34.6	40.0	37.3	5.48	1.95	0.90	8.33
MEAN DM%				20.6	35.7	18.8	25.0

75/R/RW/5

GREAT FELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

MANURE	WINTER WHEAT:		KALE:		BARLEY:		LEY: DRY MATTER			POTATOES:	
	GRAIN	STRAW	FRESH WEIGHT	GRAIN	STRAW	1ST CUT	2ND CUT	3RD CUT	4TH CUT	TOTAL OF 4 CUTS	TOTAL TUBERS
D	3.33	4.40	10.5	1.93	1.62	2.26	1.35	0.64	0.12	4.37	7.9
F	6.35	6.80	54.0	4.08	3.84	5.22	2.40	0.69	0.24	8.55	23.3
FMGCA	5.55	6.33	58.4	5.19	4.18	5.11	2.34	0.67	0.26	8.38	26.0
FMGS	6.58	6.98	46.6	4.94	4.36	4.87	2.17	0.83	0.28	8.15	27.1
FCAS	6.00	7.52	47.1	5.12	3.51	4.52	2.09	0.79	0.23	7.63	25.2
FMGCAS	5.78	6.15	54.5	4.51	4.36	5.33	2.51	0.95	0.25	9.04	24.0
FMGCASITE	6.16	6.84	55.4	5.05	4.66	5.32	2.19	0.70	0.30	8.51	26.1
MEAN DM%	89.2	90.8		86.8	70.1	21.5	33.4	41.4	18.3	28.6	

75/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 sixteenth 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 71-74/W/RN/6.

Design: 1 blocks of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks: 1. Crops:-

After old grass (1960-73):

	CROP
Ley	LEY/G
In arable rotation since 1960:	
Barley	BARLEY
Ley	LEY/A
Potatoes	POTATOES
Sugar beet	SUGRBEET
Oats	OATS
Permanent grass, sown autumn 1973	PERMGRAS

Plots: 2. Fertilisers and farmyard manure:-

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

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.

P: P₂O₅ at 63 kg as triple superphosphate.

K: K₂O at 252 kg as potassium bicarbonate.

D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

75/W/EM/6

- NOTES: (1) The old grass block was dug in autumn 1973 and now follows the arable rotation the crop in 1975 being ley. A new block was sown to permanent grass on adjacent land.
- (2) Potatoes and sugar beet test on sub plots: 0, 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: Weedkiller: Ioxynil at 0.17 kg with mecoprop at 0.51 kg in 450 l.

Sugar beet: Manures: Boron at 0.92 kg B2O3 as borax in 1120 l. Insecticide: Menazon at 0.28 kg in 280 l on two occasions.

Barley: Weedkiller: Ioxynil at 0.17 kg with mecoprop at 0.51 kg in 450 l. Fungicide: Tridemorph at 0.53 kg in 340 l.

Potatoes: Insecticide: Menazon at 0.28 kg in 280 l on two occasions the second being with fungicide. Fungicide: Mancozeb at 1.3 kg in 280 l on two occasions the first being with insecticide.

Permanent Grass and leys: Manures: MgO at 82 kg as Epsom salts.

Seed: Winter oats: Peniarth, sown at 210 kg.

Sugar beet: Klein E, sown at 5.6 kg.

Barley: Julia, dressed with ethirimol, sown at 150 kg.

Potatoes: Maris Piper.

Grass-clover ley: R.V.P. Italian ryegrass and Hungaropoly red clover.

Permanent grass: S215 Meadow fescue at 20 kg, S24 perennial ryegrass at 20 kg, crested dogtail 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: Balancing Mg applied: 10 Sept, 1974. Plots dug by hand, P and K applied: 17 Sept. Seed sown: 21 Oct. First half N applied: 19 Mar, 1975. Weedkiller applied: 25 Apr. Second half N applied: 13 May. Harvested: 24 July.

Sugar beet: FYM applied, plots dug by hand: 25 Nov, 1974. P and K applied: 18 Feb, 1975. Rotary cultivated, first half N applied, Mg applied to half plots, raked in, seed drilled: 25 Apr. Singled: 11 June. Second half N applied: 12 June. Insecticide applied: 18 June, 21 July. Boron applied: 3 July. Lifted: 13 Oct.

Barley: Balancing Mg applied: 8 Nov, 1974. Plots dug by hand: 25 Nov. P and K applied: 18 Feb, 1975. First half N applied, rotary cultivated, raked, seed sown, raked: 4 Mar. Second half N applied: 13 May. Weedkiller applied: 21 May. Fungicide applied: 11 June. Harvested: 12 Aug.

Grass-clover ley: Both blocks: Rotary cultivated, ryegrass seed sown, clover seed broadcast, raked: 9 Aug, 1974. P, K and basal Mg applied: 26 Nov. N applied: 19 Mar, 1975. Cut three times: 30 May, 21 July, 1 Oct.

75/W/RN/6

Potatoes: FYM applied, plots dug by hand: 25 Nov, 1974. P and K applied: 18 Feb, 1975. First half N applied, rotary cultivated, raked, Mg applied to half plots, potatoes planted, earthed up: 13 May. Second half N applied: 12 June. Insecticide applied: 18 June. Insecticide with fungicide applied: 21 July. Fungicide applied: 7 Aug. Lifted plots with neither K nor FYM: 12 Sept. Remaining plots lifted: 29 Sept.

Permanent grass: P, K and basal Mg applied: 26 Nov, 1974. First third N applied: 19 Mar, 1975. Second third N applied: 30 May. Third third N applied: 4 Sept. Cut three times: 30 May, 28 Aug, 29 Oct.

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

75 W/RW/6
TONNES/HECTARE

MANURE	OATS		ROOTS (WASHED)	SUGAR BEET		TOPS	BARLEY		POTATOES		
	GRAIN	STRAW		SUGAR %	TOTAL SUGAR		GRAIN	STRAW	-	MG	MEAN
0	1.55	2.02	4.8	13.9	0.66	6.3	2.01	1.55	4.2	5.7	4.9
N1	2.89	3.78	5.5	12.8	0.70	9.4	2.84	2.89	5.0	5.2	5.1
P	1.73	2.16	6.5	14.1	0.92	6.3	1.99	1.41	5.0	4.3	4.7
N1P	3.75	4.42	3.9	13.2	0.52	9.1	2.28	2.64	5.1	4.2	4.6
K	1.98	2.32	7.9	14.4	1.13	6.7	2.14	1.59	16.8	14.0	15.4
N1K	2.65	4.46	11.4	14.0	1.60	12.5	3.19	4.09	14.5	16.2	15.4
PK	1.74	2.67	6.7	14.4	0.96	6.0	2.28	1.69	12.7	13.4	13.1
N1PK	3.69	6.22	8.2	13.6	1.12	10.6	4.54	4.61	19.0	17.0	18.0
N2PK	4.28	6.00	15.2	14.2	2.16	16.7	5.72	5.73	15.9	15.0	15.4
D	2.82	3.84	10.8	14.7	1.58	9.6	2.86	2.31	19.0	18.2	18.6
N1PKD	3.88	8.01	15.0	14.2	2.13	14.0	4.89	5.13	20.8	24.2	22.5
N2PKD	5.28	8.67	16.7	13.7	2.29	17.6	5.92	6.00	24.4	30.3	27.4
MEAN DM%	77.1	49.8					89.4	90.6			

75/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 - Sawyers I and Great Field IV.

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

The sixteenth year, barley, wheat (Sawyers I), barley, ley (Great Field IV).

For previous years see 'Details' 1967, 68/B/5(t), 69/R/RN/7, 70/R/RN/7(t) and 71-74/R/RN/7.

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

Whole plot dimensions:

Gt. Field IV: 4.27 x 18.3

Sawyers I: 4.27 x 20.1.

Treatments: Rates and frequency of applying phosphate:-

	P2O5
None	0
Annual dressings, kg P2O5:	
29	29 ANN
57	57 ANN
115	115 ANN
172	172 ANN
Triennial dressings, kg P2O5 (last applied 1975):	
86	86 TRI
172	172 TRI
Six-yearly dressings, kg P2O5 (last applied 1973):	
344	344 SIX
688	688 SIX
1032	1032 SIX
Single dressing, kg P2O5 (applied autumn 1959):	
376 as Gafsa rock phosphate	376 G(1)
376 as granular superphosphate	376 S(1)

75/R/RN/7

- NOTES: (1) Since 1974 the original rotation of potatoes, barley, swedes on both fields has been changed. Blocks after barley are sown to wheat on Sawyers I, to ley on Great Field IV.
- (2) Since 1960 all phosphate has been applied as superphosphate.
- (3) The six-yearly dressings were applied half in autumn before ploughing, half in spring.
- (4) The ley sown in 1974 established poorly. It was ploughed and resown in 1975.

Standard applications:

Barley: Manures: (25:0:16) at 390 kg combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (Sawyers I: 'Banlene Plus' at 5.6 l in 220 l, Great Field IV: 'Tetralax Plus' at 7.0 l in 220 l).

Wheat (Sawyers I only): Manures: K2O at 90 kg as muriate of potash. N at 130 kg as 'Nitro-Chalk'. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l). Wheat after barley only: Ground chalk at 2.9 tonnes.

First year and reseeded ley (Gt. Field only): Manures: K2O at 120 kg as muriate of potash. N at 60 kg as 'Nitro-Chalk'.

First year ley only: Ground chalk at 2.9 tonnes.

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

Wheat: Cappelle, sown at 200 kg.

Grass clover mixture: 6.7 kg S215 Meadow Fescue, 4.5 kg Contessa Meadow Fescue, 4.5 kg S48 Timothy, 1.7 kg NZ Huia White Clover, 0.6 kg Wild White Clover. Sown at 24 kg.

Cultivations, etc.: (both fields for barley)

Barley: Ploughed: 29 Oct, 1974. Spring-tine cultivated and P applied: 26 Feb, 1975. Power harrowed and seed sown: 27 Feb. Weedkiller applied: 20 May. Combine harvested: 8 Aug.

Wheat: Chalk applied: 10 Oct, 1974. Ploughed: 28 Oct. P applied: 26 Nov. K applied, power harrowed and seed sown: 9 Dec. N applied: 23 Apr, 1975. Weedkiller applied: 19 May. Combine harvested: 13 Aug.

Leys: First year only: Chalk applied: 10 Oct, 1974. Ploughed: 29 Oct. Reseeded only. Ploughed: 24 Jan, 1975. All leys: Spring-tine cultivated, N and K applied: 5 May. P applied: 6 May. Power harrowed: 7 May. Seed sown: 9 May. Topped: 14 and 28 July, 19 Aug.

75/R/RN/7

BARLEY

TABLES OF MEANS

	GRAIN TONNES/HECTARE		STRAW TONNES/HECTARE	
	GREAT FIELD IV	SAWYERS I	GREAT FIELD IV	SAWYERS I
P205				
0	1.29	4.58	2.22	2.12
29 ANN	2.80	4.86	2.51	2.22
57 ANN	2.85	5.15	2.51	2.40
115 ANN	1.83	4.86	3.18	2.25
172 ANN	4.66	3.60	2.93	2.71
86 TRI	2.76	4.78	2.58	2.22
172 TRI	1.69	5.44	3.56	2.40
344 SIX	4.02	4.05	2.12	2.38
688 SIX	3.23	5.16	2.99	2.49
1032 SIX	3.81	4.94	2.63	2.10
376G(1)	3.99	4.32	2.14	2.05
376S(1)	3.06	4.26	2.04	1.90
MEAN	3.00	4.67	2.62	2.27

SAWYERS I ONLY GRAIN

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

TABLE	P205
-----	-----
SED	0.729

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.729	15.6
GRAIN MEAN DM %	86.5	88.6	93.6
PLOT AREA HARVESTED	0.00520		94.6

75/R/RN/7

WHEAT SAWYERS I

TABLES OF MEANS

	GRAIN TONNES/HECTARE		STRAW TONNES/HECTARE	
	AFTER BARLEY	AFTER WHEAT	AFTER BARLEY	AFTER WHEAT
P205				
0	5.34	1.85	3.39	1.09
29 ANN	6.43	1.93	4.62	1.28
57 ANN	6.39	2.48	3.75	1.68
115 ANN	6.54	2.78	4.03	1.49
172 ANN	6.77	3.18	4.84	1.76
86 TRI	6.60	1.97	4.43	1.23
172 TRI	6.60	2.31	4.72	1.35
344 SIX	6.11	2.94	4.35	1.61
688 SIX	6.40	2.91	4.28	1.87
1032 SIX	6.78	3.59	5.18	2.39
376G(1)	5.88	1.59	3.92	1.09
376S(1)	6.10	2.11	3.77	1.13
MEAN	6.33	2.47	4.27	1.50

AFTER BARLEY

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

TABLE	P205
-----	-----
SED	0.371

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.3709	5.9

AFTER WHEAT

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

TABLE	P205
-----	-----
SED	0.609

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.609	24.6

GRAIN MEAN DM %	86.9	87.5	94.3	93.9
PLOT AREA HARVESTED	0.00572			

75/R/RN/8

CULTIVATION/WEEDKILLER

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

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

The 15th year, barley.

For previous years see 'Details' 1967, 68/E/6(t), 69/R/RN/8(t), 70/R/RN/8, 71/R/RN/8(t) and 72-74/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. Primary cultivations annually:

CULTIVAT

Ploughed, 19 Mar, 1975

PLOUGH

Rotary cultivated, 20 Mar

ROTAVATE

Deep-tine cultivated twice, 17, 18 Mar

DEEPTINE

2. Weed control to potatoes 1974:

WEEDCNTR(74)

Mechanical

MECHANCL

Linuron plus paraquat

LIN/PAR

Linuron plus paraquat. Grubbed and rotary ridged

LIN/PARR

Sub plots: 3. Hormone weedkiller to barley 1975:

WEEDKILL(75)

None

NONE

Dicamba plus mecoprop and MCPA ('Tetralix Plus' at 7.0 l in 220 l) 6 June, 1975

DI/ME/MC

4. Paraquat weedkiller to wheat stubble autumn 1973:

WEEDKILL(73)

None

NONE

Paraquat

PARAQUAT

plus three extra treatments:-

EXTRA

75/R/RN/8

Spike rotary cultivated, 23 Apr. Given linuron plus paraquat to potatoes 1974, with sub plot treatments 3 and 4 above.

SPIKE

Shallow ploughed, 28 Feb. Given linuron plus paraquat to potatoes 1974, whole plot given paraquat as 4 above, with sub plot treatment 3 above

(SH)PLCH

Standard cultivations as considered best for each crop. Deep-tine cultivated twice, 19 Mar for barley. Given linuron plus paraquat and grubbed and rotary ridged to potatoes 1974, with sub plot treatments 3 and 4 above.

STANDARD

Basal applications: Manures (20:14:14) at 380 kg combine drilled.

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

Cultivations, etc.:- Spring-tine cultivated: 24 Dec, 1974. Seed sown: 23 Apr, 1975. Combine harvested: 21 Aug.

75/R/RN/3

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

OMITTING EXTRA PLOTS

CULTIVTN	PLOUGH	ROTAVATE	DEEPTINE	MEAN
WEEDCNTL(74)				
MECHANCL	3.70	3.33	3.68	3.57
LIN/PAR	3.79	3.55	3.72	3.69
LIN/PARR	3.83	3.43	4.09	3.78
WEEDKLLR(75)				
NONE	3.89	3.74	3.54	3.72
DI/ME/MC	3.66	3.14	4.12	3.64
WEEDKLLR(73)				
NONE	3.94	3.56	3.73	3.74
PARAQUAT	3.61	3.32	3.94	3.62
MEAN	3.77	3.44	3.83	3.68

EXTRA PLOTS ONLY

EXTRA	SPIKE	(SH)PLGH	STANDARD
WEEDKLLR(75)			
NONE	3.53	4.06	3.89
DI/ME/MC	3.80	4.15	4.51
WEEDKLLR(73)			
NONE	4.04		4.00
PARAQUAT	3.29	4.11	4.39
MEAN	3.66	4.11	4.20

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

TABLE	CULTIVTN	WEEDCNTL(74)	WEEDKLLR(73)	WEEDKLLR(75)
SED	0.189	0.189	0.143	0.143

TABLE	CULTIVTN	CULTIVTN	CULTIVTN
	WEEDCNTL(74)	WEEDKLLR(73)	WEEDKLLR(75)
SED	0.328	0.258	0.258
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
CULTIVTN		0.248	0.248

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.328	8.9
BLOCK.WP.SP	8	0.429	11.7

GRAND MEAN 3.76

GRAIN MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00434

75/R/RN/11

IRRIGATION

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

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

The twelfth year, beans (Great Field I), barley (Great Field II).

For previous years see 64/C/15(t), 65/C/14(t), 66/C/9(t), 67/C/7(t), 68/C/6(t), 69/R/RN/11(t), 70/R/RN/11(t), 71/R/RN/11(t), 72/R/RN/11(t) and 73-74/R/RN/11.

Design: 4 randomised blocks of 4 plots split into half and quarter plots (Great Field I).
2 randomised blocks of 2 plots split into quarter plots (Great Field II).

Whole plot dimensions: Beans - 15.2 x 32.0, barley - 15.2 x 30.5.

Treatments to beans: All combinations of:-

Whole plots: 1. Irrigation (by oscillating spray line):	IRRIGATI
None	NONE
Early	EARLY
Late	LATE
Full	FULL

Half plots: 2. Spacing between rows (with same wt. of seed/ha):	ROWSPACE
18 cm (7 in.)	18 CM
53 cm (21 in.)	53 CM

Quarter plots: 3. Aldicarb:	ALDICARB
None	0
14 kg	14

NOTE: One block did not receive the aldicarb treatment.

Treatments to barley: All combinations of:-

Whole plots: 1. Irrigation:	IRRIGATI
None	NONE
Full	FULL

75/R/RN/11

Half plots: 2. Form of N:		N FORM
	'Nitro-Chalk'	
	'Gold-N' (sulphur-coated urea)	NITRO-C GOLD-N
Quarter plots: 3. Rate of N (kg):		N RATE
	35	35
	70	70

Standard applications:

Beans: Manures: (0:14:28) at 400 kg. Weedkiller: Simazine at 1.1 kg in 220 l.

Barley: Manures: (0:20:20) at 310 kg combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l).

Seed: Beans: Minden, sown at 220 kg.

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

Cultivations, etc.:-

Beans: Ploughed: 23 Jan, 1975. Spring-tine cultivated: 28 Feb. PK applied: 24 Mar. Aldicarb applied and spike rotary cultivated: 25 Apr. Seed sown: 26 Apr. Simazine applied: 28 Apr. Combine harvested: 30 Aug.

Barley: Ploughed: 24 Jan, 1975. Spring-tine cultivated: 28 Feb. N applied, power harrowed, seed sown: 24 Apr. Weedkiller applied: 4 June. Combine harvested: 21 Aug.

75/R/RN/11

RAINFALL AND IRRIGATION: MM

Week- ending	Rainfall	IRRIGATION			
		EARLY	SPRING BEANS LATE	FULL	BARLEY FULL
May 3	6.8				
May 10	13.0				
May 17	43.9				
May 24	3.3				
May 31	0.8				
June 7	7.6				
June 14	Trace	25		25	25
June 21	7.8	20		20	25
June 28	8.1				
July 5	Trace	25		25	25
July 12	6.8				
July 19	9.5		30	30	30
July 26	2.9		25	25	25
Aug 2	-		25	25	
Aug 9	10.9				
Aug 16	3.7		30	30	
Aug 23	3.9				
Aug 30	0.6				
Sept 6	Trace				
Sept 13	52.7				
Sept 20	13.0				
Sept 27	33.2				
Oct 4	9.9				
Total	238.4	70	110	180	130

75/R/RN/11

SPRING BEANS - BLOCKS RECEIVING ALDICARB

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROWSPACE	18 CM	53 CM	MEAN
IRRIGTN			
NONE	2.31	2.04	2.17
EARLY	2.03	2.22	2.12
LATE	2.82	2.70	2.76
FULL	2.57	2.35	2.46
MEAN	2.43	2.33	2.38

ALDICARB	0	14	MEAN
IRRIGTN			
NONE	1.47	2.87	2.17
EARLY	1.82	2.43	2.12
LATE	2.03	3.48	2.76
FULL	2.27	2.64	2.46
MEAN	1.90	2.86	2.38

ALDICARB	0	14	MEAN
ROWSPACE			
18 CM	1.91	2.95	2.43
53 CM	1.89	2.76	2.33
MEAN	1.90	2.86	2.38

ROWSPACE	18 CM	53 CM		
ALDICARB	0	14	0	14
IRRIGTN				
NONE	1.57	3.05	1.38	2.69
EARLY	1.72	2.33	1.92	2.52
LATE	1.94	3.70	2.13	3.26
FULL	2.40	2.73	2.15	2.55

75/R/RN/11

SPRING BEANS - BLOCKS RECEIVING ALDICARB

GRAIN TONNES/HECTARE

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

TABLE	IRRIGTN	ROWSpace	ALDICARB	IRRIGTN ROWSpace
SED	0.501	0.101	0.153	0.520
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN				0.201

TABLE	IRRIGTN ALDICARB	ROWSpace ALDICARB	IRRIGTN ROWSpace ALDICARB
SED	0.545	0.183	0.604
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN	0.306		0.367
ROWSpace		0.217	
IRRIGTN.ROWSpace			0.433
IRRIGTN.ALDICARB			0.367

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.613	25.8
BLOCK.WP.HP	8	0.247	10.4
BLOCK.WP.HP.QP	16	0.530	22.3

GRAIN MEAN DM% 84.8

QUARTER PLOT AREA HARVESTED ROWSPACE 18CM - 0.00412, 53CM - 0.00463

75/R/RN/11

SPRING BEANS - BLOCKS NOT RECEIVING ALDICARB

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

ROWSpace	18 CM	53 CM	MEAN
IRRIGTN			
NONE	1.27	1.02	1.15
EARLY	1.09	1.15	1.12
LATE	1.69	1.28	1.48
FULL	2.25	1.99	2.12
MEAN	1.58	1.36	1.47

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

TABLE	ROWSpace	IRRIGTN ROWSpace
SED	0.201	0.403 *

* ONLY WHEN COMPARING MEANS WITH SAME LEVEL OF IRRIGTN

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

STRATUM	DF	SE	CV%
BLOCK.WP.HP.QP	8	0.403	27.4

GRAIN MEAN DM% 85.5

QUARTER PLOT AREA HARVESTED ROWSPACE 18CM - 0.00412, 53CM - 0.00463

75/R/RN/11

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

N FORM IRRIGTN	NITRO C	GOLD N	MEAN
NONE	4.00	3.83	3.92
FULL	3.26	3.37	3.31
MEAN	3.63	3.60	3.62

N RATE IRRIGTN	35	70	MEAN
NONE	3.87	3.96	3.92
FULL	3.15	3.48	3.31
MEAN	3.51	3.72	3.62

N RATE N FORM	35	70	MEAN
NITRO C	3.31	3.95	3.63
GOLD N	3.71	3.49	3.60
MEAN	3.51	3.72	3.62

N FORM N RATE IRRIGTN	NITRO C 35	GOLD N 70	GOLD N 35	70
NONE	3.48	4.52	4.26	3.41
FULL	3.14	3.38	3.16	3.57

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

TABLE	IRRIGTN	N FORM	N RATE	IRRIGTN N FORM
REP	8	8	8	4
SED	0.266	0.122	0.337	0.292
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN				0.173

TABLE	IRRIGTN N RATE	N FORM N RATE	IRRIGTN N FORM N RATE
SED			
ONLY WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: IRRIGTN	0.477		0.507
N FORM		0.477	
IRRIGTN.N FORM			0.675
IRRIGTN.N RATE			0.507

75/R/RN/11

BARLEY

GRAIN TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP.HP.QP	4	0.675	18.7

GRAIN MEAN DM% 81.3

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

N FORM	NITRO C	GOLD N	MEAN
IRRIGTN			
NONE	2.22	2.16	2.19
FULL	1.85	2.17	2.01
MEAN	2.03	2.17	2.10

N RATE			MEAN
IRRIGTN	35	70	
NONE	2.11	2.28	2.19
FULL	1.76	2.25	2.01
MEAN	1.94	2.26	2.10

N RATE			MEAN
N FORM	35	70	
NITRO C	1.89	2.18	2.03
GOLD N	1.98	2.35	2.17
MEAN	1.94	2.26	2.10

N FORM	NITRO C		GOLD N	
N RATE	35	70	35	70
IRRIGTN				
NONE	2.22	2.22	1.99	2.34
FULL	1.55	2.14	1.98	2.36

STRAW MEAN DM% 92.5

QUARTER PLOT AREA HARVESTED 0.00347

75/W/RN/12

ORGANIC MANURING

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

Sponsor: C.E.C. Mattingly.

The eleventh year, sugar beet, barley.

For previous years see 66/C/31(t), 67/C/24(t), 68/C/18(t), 69/W/RN/12(t), 70/W/RN/12(t), 71/W/RN/12(t), 72/W/RN/12(t) and 73-74/W/RN/12.

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

Whole plot dimensions: 8.53 x 30.5.

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

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

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

Sub plots: 2. Fertiliser nitrogen (kg N) in 1975:

		N	
Sugar beet	Barley	S. BEET BARLEY	
None	None	0	0
40	25	40	25
80	50	80	50
120	75	120	75
160	100	160	100
200	125	200	125
240	150	240	150
280	175	280	175

Standard applications:

Sugar beet: Manures: Ground chalk at 5 tonnes. P₂O₅ at 114 kg as super-phosphate, K₂O at 180 kg as muriate of potash in autumn. (0:20:20) at 570 kg, MgO at 100 kg as Epsom salts in the seedbed. Boron at 8.2 kg B₂O₃ (as 'Solubor') in 390 l. Weedkiller: Aminotriazole at 4.5 kg in 280 l. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l on the first occasion and in 390 l on the second occasion.

75/W/RN/12

Barley: Manures: (0:20:20) at 280 kg, combine drilled. Weedkiller: Ioxynil at 0.52 kg and mecoprop at 1.6 kg in 280 l.

Seed: Sugar beet: Klein E, sown at 5.6 kg.

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

Cultivations, etc.:-

Sugar beet: Weedkiller applied: 18 Sept, 1974. Subsoiled, tines 140 cm apart and 60 cm deep: 19 Sept. Ground chalk applied: 9 Oct. PK applied: 15 Nov. Ploughed: 9 Dec. PK and Mg applied, spring-tine cultivated with crumbler: 28 Apr, 1975. Seed sown: 29 Apr. N applied: 29-30 Apr. Tractor hoed three times: 29 May, 27 June, 30 June. Insecticide applied: 9 June. Singled: 16-18 June. Insecticide with boron applied: 1 July. Side hoed: 10-17 July. Lifted: 11-14 Nov.

Barley: Ploughed in sugar beet tops: 14 Jan, 1975. Spring-tine cultivated with crumbler: 3 Mar. Seed sown: 4 Mar. N applied: 18 Mar. Weedkiller applied: 20 May. Combine harvested: 11 Aug.

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

*** TABLES OF MEANS ***

N	0	40	80	120	160	200	240	280	MEAN
MANURE									
FYM	8.1	11.6	14.3	14.8	15.2	15.5	13.5	15.4	13.6
STRAW	6.4	10.2	11.2	11.9	12.5	13.2	14.0	13.7	11.6
PEAT	5.2	7.2	10.5	11.0	12.2	13.9	13.9	13.8	11.0
GREENMNR	5.8	9.0	8.2	9.0	12.0	12.3	12.5	12.8	10.2
FERT FYM	4.2	4.1	8.0	8.6	9.6	11.0	11.5	12.3	8.6
FERT STR	3.8	7.8	8.8	11.6	10.6	11.4	11.3	13.2	9.8
CLOVRLEY	7.2	11.4	12.8	14.2	12.7	15.7	16.6	15.0	13.2
GRASSLEY	10.0	12.5	13.8	16.8	18.5	13.2	16.3	14.7	14.5
MEAN	6.3	9.2	11.0	12.2	12.9	13.3	13.7	13.9	11.6

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

TABLE	MANURE	N	MANURE
			N
SED	1.37	0.52	1.95

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:
MANURE 1.48

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	1.37	11.8
BLOCK.WP.SP	56	1.43	12.3

75/W/RN/12

SUGAR BEET

TOPS TONNES/HECTARE

*** TABLES OF MEANS ***

	N	0	40	80	120	160	200	240	280	MEAN
MANURE										
FYM		7.4	8.7	11.7	12.0	13.3	14.6	13.8	13.5	11.9
STRAW		5.6	8.7	10.9	12.1	12.8	14.5	13.7	13.9	11.6
PEAT		4.3	7.3	9.3	11.2	13.7	14.2	13.6	12.3	10.8
GREENMNR		5.3	8.9	8.7	11.4	14.4	12.6	13.5	13.7	11.1
FERT FYM		4.3	5.9	7.1	8.4	11.1	11.2	13.4	13.4	9.4
FERT STR		4.1	6.3	9.0	11.5	11.9	11.6	13.1	12.3	10.0
CLOVRLEY		7.5	9.9	11.2	13.3	11.9	14.6	15.1	15.6	12.4
GRASSLEY		7.0	8.9	10.3	13.0	15.4	12.1	14.9	13.5	11.9
MEAN		5.7	8.1	9.8	11.6	13.1	13.2	13.9	13.5	11.1

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

TABLE	MANURE	N	MANURE
			N
SED	1.68	0.46	2.07
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			1.29

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	1.68	15.1
BLOCK.WP.SP	56	1.29	11.6

SUB PLOT AREA HARVESTED 0.00130

75/W/RN/12

SUGAR BEET

SUGAR PERCENTAGE

*** TABLES OF MEANS ***

N	0	40	80	120	160	200	240	280	MEAN
MANURE									
FYM	15.3	15.1	15.4	15.1	14.7	14.9	14.6	14.3	14.9
STRAW	15.4	15.3	15.1	15.2	14.8	15.0	15.0	14.8	15.1
PEAT	15.3	15.2	15.4	15.3	15.2	15.1	14.9	14.7	15.1
GREENMNR	15.4	15.4	15.0	15.0	14.9	14.7	14.5	14.5	14.9
FERT FYM	15.3	15.3	15.0	15.1	14.9	14.4	14.4	14.1	14.8
FERT STR	15.3	15.4	15.3	15.4	15.0	15.0	15.0	15.0	15.2
CLOWRLEY	15.2	15.2	15.2	15.2	14.7	14.7	14.5	14.5	14.9
GRASSLEY	15.3	15.3	15.3	14.8	15.1	14.5	14.7	14.2	14.9
MEAN	15.3	15.3	15.2	15.1	14.9	14.8	14.7	14.5	15.0

TOTAL SUGAR TONNES/HECTARE

*** TABLES OF MEANS ***

N	0	40	80	120	160	200	240	280	MEAN
MANURE									
FYM	1.25	1.75	2.19	2.24	2.24	2.30	1.97	2.21	2.02
STRAW	0.98	1.56	1.69	1.80	1.84	1.98	2.10	2.03	1.75
PEAT	0.79	1.09	1.62	1.68	1.85	2.10	2.07	2.02	1.65
GREENMNR	0.89	1.39	1.24	1.36	1.79	1.81	1.81	1.86	1.52
FERT FYM	0.63	0.62	1.20	1.30	1.43	1.60	1.65	1.75	1.27
FERT STR	0.58	1.20	1.35	1.79	1.60	1.72	1.69	1.98	1.49
CLOWRLEY	1.09	1.73	1.95	2.16	1.87	2.31	2.42	2.17	1.96
GRASSLEY	1.54	1.92	2.10	2.48	2.78	1.91	2.40	2.10	2.15
MEAN	0.97	1.41	1.67	1.86	1.93	1.97	2.01	2.02	1.73

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

TABLE	MANURE	N	MANURE
			N
SED	0.206	0.081	0.298

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:
MANURE 0.230

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.206	11.9
BLOCK.WP.SP	56	0.230	13.3

75/W/RN/12

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS***

	N	0	25	50	75	100	125	150	175	MEAN
MANURE										
FYM		1.80	2.98	4.20	4.42	4.45	4.97	4.61	4.44	3.98
STRAW		1.61	2.82	3.99	4.62	4.39	4.35	4.24	4.49	3.81
PEAT		0.78	2.48	3.20	4.26	4.27	4.54	4.77	4.37	3.58
GREENMNR		2.10	2.95	3.97	4.11	4.90	4.56	4.65	4.36	3.95
FERT FYM		0.63	1.74	3.46	3.72	4.34	4.16	4.48	4.90	3.43
FERT STR		0.91	2.27	3.28	4.37	4.33	4.16	3.97	3.75	3.38
CLOVRLEY		2.02	3.45	4.42	4.41	4.29	4.82	4.61	4.79	4.10
GRASSLEY		2.43	3.20	4.27	4.66	4.78	4.95	4.66	4.08	4.13
MEAN		1.54	2.74	3.85	4.32	4.47	4.56	4.50	4.40	3.80

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

TABLE	MANURE	N	MANURE N
SED	0.409	0.157	0.582

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:
MANURE 0.443

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.409	10.8
BLOCK.WP.SP	56	0.443	11.7

GRAIN MEAN DM% 88.3

STRAW TONNES/HECTARE

*** TABLES OF MEANS***

	N	0	25	50	75	100	125	150	175	MEAN
MANURE										
FYM		1.15	1.84	2.17	2.38	2.40	2.94	2.26	2.68	2.23
STRAW		0.74	1.59	2.44	2.82	3.02	3.14	3.00	3.17	2.49
PEAT		0.51	1.39	1.83	2.08	2.55	2.67	2.72	2.63	2.05
GREENMNR		1.06	1.56	1.88	2.57	3.15	3.05	2.96	2.82	2.38
FERT FYM		0.45	1.05	1.72	2.27	2.31	2.51	2.62	2.75	1.96
FERT STR		0.51	1.34	1.83	2.82	2.41	2.52	2.74	2.36	2.07
CLOVRLEY		1.02	2.07	2.49	2.54	3.05	3.27	3.24	3.20	2.61
GRASSLEY		1.32	1.74	2.45	3.00	3.27	3.47	3.26	2.98	2.69
MEAN		0.85	1.57	2.10	2.56	2.77	2.94	2.85	2.83	2.31

STRAW MEAN DM% 91.7

SUB PLOT AREA HARVESTED 0.00173

75/W/RN/13

INTENSIVE CEREALS

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

Sponsor: D.B. Slope.

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

For previous years see 66/B/9(t), 67/B/9, 68/B/7(t), 69/W/RN/13(t), 70/W/RN/13(t), 71/W/RN/13(t) and 72-74/W/RN/13.

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

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:-

Whole plots: 1. Previous crops:

PREVCROP

1968 1969 1970 1971 1972 1973 1974

L	P	C	C	C	L	P	C/C/L/P
P	C	C	C	L	P	C	C/L/P/C
C	C	C	L	P	C	C	L/P/C/C
C	C	L	P	C	C	C	P/C/C/C
C	L	P	C	C	C	L	C/C/C/L
C	C	C	C	C	C	C	C/C/C/C

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

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

N

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

NOTE: Ley and potatoes receive standard N only, residues of dressings to cereals are tested (NRESID).

75/W/RN/13

Basal applications: All crops: P2O5 at 130 kg, K2O at 260 kg as (0:14:28), half ploughed in, half applied to the plough furrow.

Standard applications:

Leys: N at 60 kg, as 'Nitro-Chalk', in seedbed and repeated after sowing.

Weedkiller: Amfotriazole at 4.5 kg in 280 l.

Potatoes: N at 150 kg as 'Nitro-Chalk'. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.28 kg ion in 280 l. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l. Fungicide: Mancozeb at 1.3 kg in 390 l.

Wheat: Weedkillers: Aminotriazole at 4.5 kg in 280 l. Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.

Barley: Weedkillers: Aminotriazole at 4.5 kg in 280 l. Ioxynil at 0.52 kg with mecoprop at 1.6 kg in 280 l.

Seed: Leys: Italian ryegrass sown at 40 kg.

Potatoes: Pentland Crown.

Wheat: Cappelle sown at 200 kg.

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

Cultivations, etc.: - All plots: Half PK applied, ploughed: 30 Oct, 1974.

Remaining PK applied: 8 Nov. Spring-tine cultivated: 27 Nov.

Leys: Aminotriazole applied: 11 Sept., 1974. Spring-tine cultivated four times with crumbler on the second and fourth occasions: 26 Feb, 3 Mar, 24 Apr, 28 Apr, 1975. N applied: 18 Apr, 11 June. Seed sown: 2 May. Topped: 8 July, 21 Aug.

Potatoes: Spring-tine cultivated three times on the second occasion with crumbler: 26 Feb, 3 Mar, 24 Apr, 1975. N applied: 18 Apr. Deep-tine cultivated: 25 Apr. Rotary cultivated, potatoes planted: 5 May. Linuron with paraquat applied: 22 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied: 25 June. Fungicide applied: 15 July. Haulm mechanically destroyed: 26 Sept. Sprayed with undiluted B.O.V. at 160 l: 2 Oct. Lifted: 6 Oct.

Wheat: Seed sown: 27 Nov, 1974. N applied: 24 Mar, 1975. Weedkiller applied: 8 May. Combine harvested: 12 Aug.

Barley: Spring-tine cultivated twice, second time with crumbler: 26 Feb, 3 Mar, 1975. Seed sown: 4 Mar. N applied: 19 Mar. Spring-tine cultivated with crumbler three times, seed resown: 1 May. Weedkiller applied: 4 June. Combine harvested: 18 Aug.

- NOTES: (1) No cuts were taken from the leys because of poor growth in a dry year.
(2) The barley was resown because of poor germination and bird damage on the first sowing.
(3) Estimates of eyespot (*Cercospora herpotrichoides*) and take-all (*Gaeumannomyces graminis*) were made on both cereal crops.

75/W/RN/13

POTATOES

WHEAT SITE

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

NRES ID	63	126	189	252	MEAN
	25.4	23.9	24.2	20.3	23.4

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

NRES ID	63	126	189	252	MEAN
	97.4	95.7	96.3	95.6	96.2

BARLEY SITE

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

NRES ID	50	100	150	200	MEAN
	29.5	29.8	26.6	25.1	27.8

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

NRES ID	50	100	150	200	MEAN
	97.5	97.4	97.5	97.4	97.5

PLOT AREA HARVESTED 0.00139

75/W/RN/13

WINTER WHEAT

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

	N	63	126	189	252	MEAN
PREVCROP						
C/C/L/P		2.75	3.36	3.45	3.43	3.25
C/L/P/C		1.46	2.97	3.39	2.83	2.66
L/P/C/C		1.91	3.15	3.14	2.80	2.75
C/C/C/C		1.81	3.04	3.22	2.77	2.71
MEAN		1.98	3.13	3.30	2.96	2.84

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

TABLE	N	PREVCROP*
		N
SED	0.150	0.300

* WITHIN THE SAME LEVEL OF PREVCROP ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	3	0.153	5.4
BLOCK.WP.SP	12	0.300	10.6

GRAIN MEAN DM% 88.2

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

	N	63	126	189	252	MEAN
PREVCROP						
C/C/L/P		2.41	4.00	4.52	4.89	3.95
C/L/P/C		1.25	2.85	3.84	3.57	2.88
L/P/C/C		1.86	2.50	3.51	3.74	2.90
C/C/C/C		2.92	3.10	3.62	3.24	3.22
MEAN		2.11	3.11	3.87	3.86	3.24

STRAW MEAN DM% 89.8

SUB PLOT AREA HARVESTED 0.00277

75/W/RN/13

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

	N	50	100	150	200	MEAN
PREVCROP						
C/C/L/P		2.08	3.13	3.23	2.88	2.83
C/L/P/C		1.73	2.83	2.94	2.82	2.58
L/P/C/C		1.84	2.47	2.73	2.87	2.49
C/C/C/C		1.64	2.11	2.14	2.29	2.04
MEAN		1.82	2.64	2.77	2.71	2.48

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

TABLE	N	PREVCROP*
		N
SED	0.117	0.234

* WITHIN THE SAME LEVEL OF PREVCROP ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	3	0.286	11.5
BLOCK.WP.SP	12	0.234	9.4

GRAIN MEAN DM% 86.9

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

	N	50	100	150	200	MEAN
PREVCROP						
C/C/L/P		1.65	2.57	2.57	2.41	2.30
C/L/P/C		1.41	2.42	2.41	2.58	2.21
L/P/C/C		1.75	2.18	2.35	2.63	2.23
C/C/C/C		1.26	1.76	1.96	1.98	1.74
MEAN		1.52	2.23	2.32	2.40	2.12

STRAW MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00277

75/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 eighth 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 73-74/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. Residues of superphosphate applied autumn 1967 and spring 1973 (kg P₂O₅):

1967	1973	Total	P ₂ O ₅ RES(73)
None	None	None (Duplicate plots)	0
128	172	360	360
376	344	720	720
753	687	1440	1440
1130	1036	2160	2160

Sub plots: 2. Residues of superphosphate applied in three equal dressings 1970-72 (kg P₂O₅, total):

	P ₂ O ₅ RES(72)
None	0
376	376

Basal applications: Manures: K₂O at 110 kg as muriate of potash. MgO at 30 kg as Epsom salts.

Cultivations, etc.: - K and Mg applied: 13 Feb, 1975. Cut once: 9-10 June.

75/W/RN/14

1ST AND ONLY CUT (9/6/75) DRY MATTER TONNES/HECTARE

*** TABLES OF MEANS ***

P205RES(73)	0	360	720	1440	2160	MEAN
P205RES(72)						
0	2.20	4.06	4.19	4.65	4.69	3.67
376	3.27	4.30	4.54	4.61	4.97	4.16
MEAN	2.74	4.18	4.36	4.63	4.83	3.91

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

TABLE	P205RES(72)	P205RES(73)	P205RES(72) P205RES(73)
SED	0.121	0.359(1) 0.415(2)	0.402(1) 0.465(2)

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:
 P205RES(73) 0.209(3)
 0.296(2)

- (1) 0 V ANY OF REMAINDER
- (2) ANY OF REMAINDER
- (3) 0

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

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.719	18.4
BLOCK.WP.SP	31	0.512	13.1

MEAN DM% 32.2

PLOT AREA HARVESTED 0.00145

75/W/RN/15

ROTATION AND FUMIGATION

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

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

The seventh year, potatoes, barley, sugar beet.

For previous years see 69/W/RN/15(t), 70/W/RN/15(t) and 71-74/W/RN/15.

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

Whole plot dimensions: 5.33 x 31.1.

Treatments:

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

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

To potatoes and sugar beet	To barley	Potatoes & s.beet	Barley
75	38	75	38
150	75	150	75
225	113	225	113

Sub plots: 2. Chemicals: CHEMICAL

None	0
Dichloropropane/dichloropropene ('D-D') at 448 kg before potatoes	DD(F)
Dichloropropane/dichloropropene ('D-D') at 448 kg before sugar beet	DD(SE)
Dichloropropane/dichloropropene ('D-D') at 448 kg before barley	DD(B)
Dichloropropane/dichloropropene ('D-D') at 448 kg before all crops	DD(ALL)
Dazomet at 224 kg before all crops since 1970 only	DAZ(ALL)
Benomyl at 22 kg before all crops since 1974 only	BEN(ALL)

Standard applications:

Potatoes: Manures: (0:14:26) at 1050 kg. Weedkiller: Laminon at 1.2 kg plus paraquat at 0.28 kg ion in 281 l. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l. Fungicide: Mancozeb at 1.3 kg in 391 l.

75/W/RG/15

2

Barley: Manures: (0:20:20) at 320 kg, combine drilled. Weedkiller: Ioxynil at 0.52 kg with mecoprop at 1.9 kg in 280 l.
Sugar beet: Manures: Magnesian limestone at 2.5 tonnes. (0:14:28) at 1050 kg. Boron at 7.4 kg B₂O₃ (as 'Solubor') applied with the second application of insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l and on the second occasion in 390 l.

Seed: Potatoes: Penllan Crowr.

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

Sugar beet: Klein E, sown at 6 kg.

Cultivations, etc.:-

All series: Ploughed: 29 Nov, 1974. 'D-D' injected: 5 Dec. Dezomet applied, and these plots only rotary cultivated, and all plots spring-tine harrowed: 6 Dec. Benomyl applied, and these plots only rotary cultivated: 23 Apr, 1975. Spring-tine cultivated, PK and N applied: 25 Apr.

Potatoes: Spring-tine cultivated with crumbler: 28 Apr. Rotary cultivated, potatoes planted: 1 May. Weedkiller applied: 22 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied: 26 June. Fungicide applied: 15 July. Haulm mechanically destroyed: 29 Sept. Sprayed with undiluted B.O.V. at 160 l: 2 Oct. Lifted: 16 Oct.

Barley: Spring-tine cultivated, seed sown: 25 Apr, 1975. Weedkiller applied: 4 June. Combine harvested: 19-22 Aug.

Sugar beet: Subsoiled: Tines 140 cm apart and 56 cm deep: 18 Sept, 1974. Magnesian limestone applied: 7 Nov. Spring-tine cultivated with crumbler: 28 Apr, 1975. Seed sown: 29 Apr. Tractor hoed: 30 May. Singled: 3-4 June. Insecticide applied: 9 June. Tractor hoed: 27 June. Boron and insecticide applied: 1 July. Side hoed by hand: 4-7 July. Lifted: 3-4 Nov.

NOTES: (1) Sugar beet plots were damaged by rabbits late in the season.
(2) Soil samples were taken after harvest for eelworm counts.

75/W/RN/15

POTATOES

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		9.8	11.1	19.4	13.4
DD(P)		22.9	31.3	25.4	26.5
DD(SB)		19.1	19.8	37.9	25.6
DD(B)		19.3	26.9	35.3	27.2
DD(ALL)		14.3	36.7	36.7	29.2
DAZ(ALL)		24.7	31.0	31.8	29.2
BEN(ALL)		12.9	20.5	24.1	19.1
MEAN		17.6	25.3	30.1	24.3

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

TABLE	CHEMICAL	N*
		CHEMICAL
-----		-----
SED	2.44	4.22

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	4.22	17.3

PERCENTAGE WARE 3.81CM(1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		89.6	86.3	94.3	90.1
DD(P)		93.3	96.9	94.8	95.0
DD(SB)		93.9	93.9	96.8	94.9
DD(B)		95.0	95.6	96.7	95.7
DD(ALL)		95.5	96.7	95.9	96.1
DAZ(ALL)		97.4	96.1	96.3	96.3
BEN(ALL)		92.7	92.7	96.0	93.5
MEAN		93.9	94.0	95.5	94.5

PLOT AREA HARVESTED 0.00052

75/W/RN/15

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

	N	38	75	113	MEAN
CHEMICAL					
0		1.19	1.73	0.65	1.19
DD(P)		1.51	1.72	1.62	1.62
DD(SB)		1.30	1.72	1.94	1.66
DD(B)		1.19	1.29	1.61	1.37
DD(ALL)		1.41	1.40	2.05	1.62
DAZ(ALL)		1.30	2.16	1.61	1.69
BEN(ALL)		1.52	1.73	1.41	1.55
MEAN		1.35	1.68	1.56	1.53

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

TABLE	CHEMICAL	N*
		CHEMICAL
SED	0.168	0.291

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.291	19.0

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED 0.00052

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

	N	38	75	113	MEAN
CHEMICAL					
0		0.84	1.13	1.02	1.00
DD(P)		0.84	1.39	1.49	1.24
DD(SB)		0.75	1.41	1.78	1.32
DD(B)		0.74	1.19	1.39	1.11
DD(ALL)		0.82	0.93	1.02	0.93
DAZ(ALL)		0.91	1.04	1.50	1.15
BEN(ALL)		1.02	1.22	1.31	1.18
MEAN		0.85	1.19	1.36	1.13

STRAW MEAN DM% 90.8

SUB PLOT AREA HARVESTED 0.00052

75/W/RN/15

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

*** TABLES OF MEANS ***

CHEMICAL	N	75	150	225	MEAN
0		6.8	11.8	10.1	9.6
DD(P)		6.9	11.0	12.4	10.1
DD(SB)		7.7	11.5	8.3	9.2
DD(B)		9.3	4.4	10.7	8.1
DD(ALL)		5.3	5.2	9.4	6.6
DAZ(ALL)		8.1	8.7	8.7	8.5
BEN(ALL)		9.4	12.3	4.5	8.7
MEAN		7.7	9.3	9.1	8.7

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

TABLE	CHEMICAL	N*
		CHEMICAL
SED	1.47	2.54

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	2.54	29.3

SUGAR PERCENTAGE

*** TABLES OF MEANS ***

CHEMICAL	N	75	150	225	MEAN
0		14.5	13.8	13.9	14.1
DD(P)		14.8	14.0	13.6	14.2
DD(SB)		14.3	13.8	13.6	13.9
DD(B)		14.6	13.8	13.3	13.9
DD(ALL)		13.9	12.9	13.4	13.4
DAZ(ALL)		14.4	13.9	13.3	13.9
BEN(ALL)		14.6	14.0	13.9	14.2
MEAN		14.4	13.7	13.6	13.9

75/W/RN/15

SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		0.99	1.63	1.40	1.34
DD(P)		1.02	1.54	1.69	1.42
DD(SB)		1.11	1.59	1.13	1.28
DD(B)		1.36	0.61	1.43	1.14
DD(ALL)		0.74	0.68	1.25	0.89
DAZ(ALL)		1.16	1.20	1.17	1.18
BEN(ALL)		1.37	1.73	0.62	1.24
MEAN		1.11	1.28	1.24	1.21

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

TABLE	CHEMICAL	N*
		CHEMICAL
SED	0.209	0.362

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.362	29.9

PLOT AREA HARVESTED 0.00130

75/W/RN/16

EFFECTS OF DRESSING WITH P & K

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

Sponsor: J. McEwen.

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

For previous year see 74/W/RN/16.

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

Whole plot dimensions: 4.27 x 2.59.

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

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

- NOTES: (1) The rates of P and K were 1930 kg P₂O₅, as superphosphate and 460 kg K₂O as muriate of potash. These quantities, applied to subsoil, were chosen to equalize available P and K in top and subsoil.
- (2) Subsoiling was done by spade, after removing the topsoil which was then replaced. PK to subsoil was worked in by forking.
- (3) PK to topsoil was applied half before ploughing in autumn half soon after on the plough furrow.

Standard applications:

- Series I: Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg. N at 160 kg as 'Nitro-Chalk'. Insecticide: Pirimicarb ('Aphox' at 0.28 kg in 340 l).
- Series II: Barley: Manures: (20:14:14) at 380 kg combine drilled. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l.
- Series III: Potatoes: Manures: (13:13:20) at 1860 kg. Weedkiller: Linuron at 1.0 kg plus paraquat at 0.42 kg ion in 340 l. Insecticide: Pirimicarb ('Aphox' at 0.28 kg in 340 l).
- Series IV: Winter wheat: Manures: (0:20:20) at 290 kg combine drilled. N at 100 kg as 'Nitro-Chalk'. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l. Fungicide: Carbendazim at 0.22 kg plus tridemorph at 0.26 kg in 170 l.

75/W/RH/16

Seed: Sugar beet: Klein E, sown at 5.6 kg.
 Barley: Julia, dressed with ethirimol, sown at 160 kg.
 Potatoes: Pentland Crown.
 Winter wheat: Cappelle, sown at 200 kg.

Cultivations, etc.:-

Series I: Sugar beet: Magnesian limestone applied: 7 Nov, 1974.
 Ploughed: 29 Nov. PK applied: 22 Apr, 1975. Spring-tine cultivated, N applied: 25 Apr. Spring-tine cultivated with crumbler, seed sown: 29 Apr. Hand weeded three times: 22 May, 13 June, 21 June. Singled by hand: 29 May. Insecticide applied twice: 5 June, 20 June. Hand lifted: 12 Nov.
 Series II: Barley: Ploughed: 29 Nov, 1974. Spring-tine cultivated: 25 Feb, 1975. Seed sown: 28 Feb. Rolled: 26 Apr. Weedkiller applied: 22 May. Hand harvested: 12 Aug.
 Series III: Potatoes: Ploughed: 29 Nov, 1974. NPK applied: 21 Apr, 1975. Spring-tine cultivated: 25 Apr. Rotary harrowed, potatoes planted: 1 May. Weedkiller applied: 22 May. Insecticide applied: 20 June. Hand lifted: 22 Oct.
 Series IV: Winter wheat: Deep-tine cultivated: 6 Nov, 1974. Spring-tine cultivated: 7 Nov. Seed sown: 8 Nov. N applied: 18 Apr, 1975. Weedkiller applied: 22 May. Fungicide applied: 20 June. Hand harvested: 7 Aug.

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

POTATOES

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	33.8	36.4	32.7	41.4	36.1

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

TABLE	PK SUB
SED	3.39

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.76	13.2

PLOT AREA HARVESTED 0.00043

75/W/RN/16

SUGAR BEET

ROOTS WASHED TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	14.5	17.1	15.2	17.3	16.0

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

TABLE	PK SUB
-----	-----
SED	1.00

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	1.22	7.6

SUGAR PERCENTAGE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	15.6	15.5	15.5	15.7	15.6

75/W/RN/16

SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	2.26	2.66	2.36	2.72	2.50

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

TABLE	PK SUB
-----	-----
SED	0.180

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.220	8.8

TOPS TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	10.0	12.4	9.6	11.4	10.9

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

TABLE	PK SUB
-----	-----
SED	0.75

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.92	8.5

PLOT AREA HARVESTED 0.00049

75/W/RN/16

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUP	PKTOP -	- PKSUB	MEAN
	2.30	3.79	1.90	4.69	3.17

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

TABLE	PK SUB
-----	-----
SED	0.240

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.293	9.3

GRAIN MEAN DM% 88.0

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	3.54	4.40	3.30	5.29	4.13

STRAW MEAN DM% 82.3

PLOT AREA HARVESTED 0.00030

75/W/RN/16

WINTER WHEAT

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.23	5.65	4.31	5.49	4.92

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

TABLE	PK SUB
-----	-----
SED	0.333

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.408	8.3

GRAIN MEAN DM% 87.3

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	7.28	8.39	6.61	8.72	7.75

STRAW MEAN DM% 64.8

PLOT AREA HARVESTED 0.00030