ROTHAMSTED RESEARCH

Yields of the Field Experiments 1973

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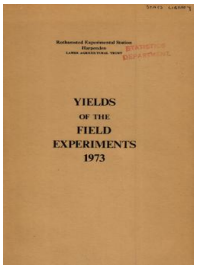

Rotations

Rothamsted Research

Rothamsted Research (1974) *Rotations ;* Yields Of The Field Experiments 1973, pp 66 - 141 **- DOI: https://doi.org/10.23637/ERADOC-1-98**

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

LEY/ARABLE

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

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

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

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

The experiment is duplicated on:-

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

A site with little organic matter initially — FOSTERS

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

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

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

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

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

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

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

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

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

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

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

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

	N73
75	75
126	126
176	176
226	226

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

	FYMRES68
None	None
30 tonnes on each occasion	FYM

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

	N73
None	0
80	80
160	160
240	240

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

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

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

Cultivations, etc. (Highfield and Fosters):-

1st year treatment crops:

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

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

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

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

1st Test Crop, Potatoes:

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

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

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

Permanent Grasses:

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

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

Standard errors per plot.

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

H = Highfield F = Fosters

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

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

POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

HIGHFIELD

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

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of ROTATION only

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

POTATOES 1ST TEST CROP

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

HIGHFIELD

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

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

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

POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

FOSTERS

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

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of ROTATION only

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

POTATOES 1ST TEST CROP

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

FOSTERS

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

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

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

WHEAT 5TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

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

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.239	0.137	0.376

Except when comparing means with same level of ROTATION 0.336

Mean D.M. % 86.3

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

WHEAT 5TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

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

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.191	0.164	0.370

Mean D.M. % 85.8

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

WHEAT 6TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

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

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.144	0.119	0.291

Mean D.M. % 86.8

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

WHEAT 6TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

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

STANDARD ERRORS OF DIFFERENCES

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

Mean D.M. % 87.2

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

WHEAT 8TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

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

STANDARD ERRORS OF DIFFERENCES

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

Mean D.M. % 85.8

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

WHEAT 8TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

N73

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

STANDARD ERRORS OF DIFFERENCES

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

Mean D.M. % 86.0

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

WHEAT 9TH TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

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

STANDARD ERRORS OF DIFFERENCES

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

Mean D.M. % 86.4

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

WHEAT 9TH TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

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

STANDARD ERRORS OF DIFFERENCES

ROTATION	N73	ROTATION N73
0.205	0.123	0.314

Except when comparing means with same level of ROTATION 0.276

Mean D.M. % 87.2

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

HAY, DRY MATTER: TONNES/HECTARE

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

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

		FOSTERS			
	3.62	2.01	3.16	0.74	9.53

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

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

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

RESEEDED GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

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

PERMANENT GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 4 CUTS

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

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73/W/RN/3

LEY/ARABLE

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

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

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

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

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

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

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

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

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

Additional treatments to first test crop, potatoes:-

1/2 plots: 1. Farmyard manure residues, last applied 1963: FYMRES63

None	None
38 tonnes on each occasion	FYM

1/4 plots (AH, A rotations only) 2. Fumigant residues, applied 1970: FUMRES70

None	None
Chloropicrin, 448 kg	Chlorop

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

Additional treatments to second test crop, winter wheat:-

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

Additional treatments to first treatment crop, potatoes:-

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

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

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Additional treatments to second treatment crop, barley:-

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

Additional treatments to third treatment crop, barley:-

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

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

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

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

Standard applications:-

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

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

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

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

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

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

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

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

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

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

Test Crops:

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

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

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

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73/W/RN/3

TABLES OF MEANS

POTATOES 1ST TEST CROP

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

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73/W/RN/3

WHEAT 2ND TEST CROP

GRAIN: TONNES/HECTARE

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

Mean D.M. % 84.8

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73/W/RM/3

WHEAT 2ND TEST CROP

STRAW: TONNES/HECTARE

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

Mean D.M. % 81.2

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73/W/RN/3

POTATOES 1ST TREATMENT CROP

ROTATION

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

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73/W/RN/3

BARLEY 2ND TREATMENT CROP

ROTATION

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

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

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73/M/RN/3

BARLEY 3RD TREATMENT CROP

ROTATION

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

Mean D.M. % Grain 82.6
Straw 92.1

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73/W/RN/4

MARKET GARDEN

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

Sponsor: A.E. Johnston.

The fourth year of revised scheme, barley.

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

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

Whole plot dimensions: 8.53 x 5.18.

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

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

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

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

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73/R/RN/5

ARABLE REFERENCE PLOTS

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

Sponsor: F.V. Widdowson.

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

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

Treatments: Fertilisers and farmyard manure:-

Original plots:

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

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

P: 63 kg P_2O_5 as superphosphate

K: 250 kg K_2O as muriate of potash

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

Additional plots:

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

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

Whole plot dimensions: 2.13 x 2.44.

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

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

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

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

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

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

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

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TABLES OF MEANS

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

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

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73/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

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

73/W/RN/6

ARABLE REFERENCE PLOTS

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

Sponsor: F.V. Widdowson.

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

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

Design: 1 block of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: Fertilisers and farmyard manure:-

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

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

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

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

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

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

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

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73/W/RN/6

TABLES OF MEANS

TONNES/HECTARE

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

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TONNES/HECTARE

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

73/R/RN/7

RESIDUAL PHOSPHATE

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

Sponsor: G.E.G. Mattingly.

The fourteenth year, potatoes, barley, swedes.

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

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

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

Treatments: Rates and frequency of applying phosphate:

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

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

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

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

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

Standard errors per plot. Sawyers I:

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

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TABLES OF MEANS

POTATOES

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

Sawyers I only - TOTAL TUBERS

STANDARD ERROR OF DIFFERENCES

P205

1.74

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BARLEY

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

Sawyers I only - GRAIN

STANDARD ERROR OF DIFFERENCES

P205

0.233

Mean D.M. %	75.1	76.5	94.1	92.9

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SWEDES, ROOTS: TONNES/HECTARE

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

Sawyers I only

STANDARD ERROR OF DIFFERENCES

P205

2.66

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73/R/RN/8

CULTIVATION/WEEDKILLER

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

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

The 13th year, winter wheat.

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

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

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

Treatments: All combinations of:-

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

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

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

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

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

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

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

Seed: Bouquet, sown at 200 kg.

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

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

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

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73/R/RN/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

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

STANDARD ERRORS OF DIFFERENCES

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

Grand mean 5.83

Mean D.M. % 86.6

73/R/RN/9

CEREAL DISEASE REFERENCE PLOTS

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

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

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

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

Design: 2 randomised blocks of 6 plots.

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

Treatments: Previous crops (1963-72):-

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

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

NOTE: Spring wheat series discontinued from 1973.

Standard applications:

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

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

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

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

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

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

TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

PREVCROP

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

Mean D.M. % 82.5

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73/R/RN/11

IRRIGATION

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

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

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

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

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

Treatments: All combinations of:-

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

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

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

Seed: King Edward, Rothamsted, once grown.

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Cultivations, etc.:

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

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

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

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

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RAINFALL AND IRRIGATION: MM

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

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

73/R/RN/11

TABLES OF MEANS

TOTAL TUBERS: TONNES/HECTARE

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

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

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

73/R/RV/11

TOTAL TUBERS: TONNES/HECTARE

STANDARD ERRORS OF DIFFERENCES

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

POPULATN N	CHITTING N	IRRIGN POPULATN CHITTING N
1.64	1.02	2.73

Except when comparing means with same levels of

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

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

73/R/RN/11

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

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

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

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

73/W/RN/12

ORGANIC MANURING

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

Sponsor: G.E.G. Mattingly.

The ninth year, winter wheat and potatoes.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

NOTE: (1) Leaf samples of both wheat and potatoes were taken for boron analysis.
(2) Soil samples were taken in the spring and mid-season for P, K and Mg analysis.
(3) Winter wheat. One plot treatment MANURE-Fert-Str, N0 was badly damaged by rabbits. Values for grain and straw estimated from visual scores made just before harvest were used in the analysis.

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

Standard errors per plot.

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

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

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

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

73/W/RN/12

TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

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

STANDARD ERRORS OF DIFFERENCES

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

Mean D.M. % 85.1

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73/W/RN/12

WINTER WHEAT

STRAW: TONNES/HECTARE

N

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

Mean D.M. % 80.3

https://doi.org/10.23637/ERADOC-1-98 *pp 61*

73/W/RN/12

POTATOES

TOTAL TUBERS: TONNES/HECTARE

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

STANDARD ERRORS OF DIFFERENCES

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

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

73/W/RN/12

POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

N

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

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73/W/RN/13

INTENSIVE CEREALS

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

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

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

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

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

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

Treatments:-

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

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

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

Whole plots: 1. Previous crops: PREVCROP

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

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

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

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

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

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

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

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

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

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

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73/W/RN/13

TABLE OF MEANS

LEY

DRY MATTER: TONNES/HECTARE

PERMANENT WHEAT BLOCKS

NRESID

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

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

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73/W/RW/13

LEY

DRY MATTER: TONNES/HECTARE

PERMANENT BARLEY PLOTS

NRESID

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

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

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73/W/RN/13

POTATOES

PERMANENT WHEAT BLOCKS

NRESID

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

PERMANENT BARLEY BLOCKS

NRESID

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

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73/W/RN/13

WINTER WHEAT

N

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

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.071	0.141

* Within the same level of PREVCROP only

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

Mean D.M. % Grain 84.4
Straw 91.2

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

73/W/RN/13

BARLEY

N

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

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.128	0.253

* Within the same level of PREVCROP only

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

Mean D.M. % Grain 84.4
Straw 90.3

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

73/W/RN/14

LONG TERM PHOSPHATE

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

Sponsor: G.E.G. Mattingly.

The sixth year, clover/grass ley.

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

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

Whole plot dimensions: 8.53 x 15.8.

Treatments:- P2O5, applied as superphosphate, cumulatively to dressings in 1967: 0, 170, 340, 690, 1030 kg.

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

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

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

NOTE: No yields were taken.

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ROTATION AND FUMIGATION

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

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

The fifth year, potatoes, barley, sugar beet.

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

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

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

Treatments:

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

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

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

Sub plots: 2. Fumigants: FUMIGANT

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

Basal applications:

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

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

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

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

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

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

Standard errors per sub plot.

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

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TABLES OF MEANS

BARLEY

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of N only

Mean D.M. % 83.9

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

Mean D.M. % 90.3

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POTATOES

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of N only

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

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

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SUGAR BEET

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of N only

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

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SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

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

STANDARD ERRORS OF DIFFERENCES

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

* Within the same level of N only

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