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Yields of the Field Experiments 1972

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72/R/RN/1 and 72/R/RN/2 Ley Arable - Old Grass, Leys, Sugar Beet, Wheat, Barley

Rothamsted Research

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

LEY/ARABLE

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

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

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

Cultivations, etc. (Highfield and Fosters):

3rd year Treatment Crops:

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

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

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

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

3rd Test Crop. Barley:

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

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

4th, 5th, 7th and 8th Test Crops. Wheat:

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

Permanent Grasses:

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

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

ERRATUM 71/R/RN/1 and 71/R/RN/2 p.66.

Yields of LUCERNE, ALL-GRASS LEY and CLOVER-GRASS LEY should be doubled. Yields of RESEEDED GRASS given on the same page are correct.

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

TABLES OF MEANS

BARLEY 3RD TEST CROP

GRAIN: TONNES/HECTARE

HIGHFIELD

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

* AH 1964 - 69

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

BARLEY 3RD TEST CROP

GRAIN: TONNES/HECTARE

FOSTERS

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

* AH 1964 - 69

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

WHEAT 4TH TEST CROP, 3RD CEREAL

GRAIN: TONNES/HECTARE

HIGHFIELD

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

* AH 1963 - 68

** C and N from 1962

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

WHEAT 4TH TEST CROP, 3RD CEREAL

GRAIN: TONNES/HECTARE

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

* AH 1963 - 68

72/R/RN/1 and 72/R/RN/2
 WHEAT 5TH TEST CROP, 4TH CEREAL
 GRAIN: TONNES/HECTARE

HIGHFIELD

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

* C and N from 1963

** C and N from 1962

72/R/RN/1 and 72/R/RN/2
 WHEAT 5TH TEST CROP, 4TH CEREAL
 GRAIN: TONNES/HECTARE

FOSTERS

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

* C and N from 1963

72/R/RW/1 and 72/R/RW/2
 WHEAT 7TH TEST CROP, 5TH CEREAL
 GRAIN: TONNES/HECTARE

HIGHFIELD

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

* C and N from 1963

** C and N from 1962

72/R/RN/1 and 72/R/RN/2
 WHEAT 7TH TEST CROP, 5TH CEREAL
 GRAIN: TONNES/HECTARE

FOSTERS

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

* C and N from 1963

72/R/RN/1 and 72/R/RN/2
 WHEAT 8TH TEST CROP, 6TH CEREAL
 GRAIN: TONNES/HECTARE

HIGHFIELD

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

* C and N from 1962

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

WHEAT 8TH TEST CROP, 6TH CEREAL

GRAIN: TONNES/HECTARE

FOSTERS

1962 - 64

1950 - 64

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

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

	HIGHFIELD	FOSTERS
	Mean	Mean

LUCERNE, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

3rd year	10.49	11.86
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ALL-GRASS LEY, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

3rd year	11.46	10.74
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CLOVER-GRASS LEY, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

3rd year	6.96	6.24
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RESEDED GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

	HIGHFIELD			FOSTERS		
	Blocks	RC	RN	Blocks	RC	RN
24th Expt1 year	1 & 4	3.90	10.25	1 & 3	5.81	8.78

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

PERMANENT GRASS, DRY MATTER: TONNES/HECTARE

TOTAL OF 3 CUTS

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

SUGAR BEET

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