

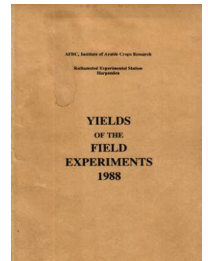
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88/R/RN/1 and 88/R/RN/2 Ley Arable - Old Grass, Leys, W. Wheat

Rothamsted Research

Rothamsted Research (1989) *88/R/RN/1 and 88/R/RN/2 Ley Arable - Old Grass, Leys, W. Wheat* ; Yields Of The Field Experiments 1988, pp 33 - 38 - DOI: <https://doi.org/10.23637/ERADOC-1-43>

88/R/RN/1 and 88/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 - Highfield and Fosters.

Sponsor: A.E. Johnston.

The 40th year, old grass, leys, w. wheat.

For previous years see 'Details' 1967 and 1973 and 74-87/R/RN/1 and 2.

The experiment is duplicated on:-

HIGHFIELD A site with much organic matter initially (ploughed out from permanent grass) (88/R/RN/1)

FOSTERS A site with little organic matter initially (88/R/RN/2)

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

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

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

From 1983 the test crops have been W, W, W.

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

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

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

C	Clover-grass ley
N	All-grass ley

From 1968 only two phases on each field continued in the six-course rotation (the museum blocks). The four other phases (the new sequence blocks) were used for studies on take-all (*Gaeumannomyces graminis*) in wheat. These studies ended in 1985 and these phases are no longer included in the experiment.

88/R/RN/1 and 88/R/RN/2

Additional treatments to 1st test crop w. wheat:-

Sub plots

FYMRES70 Farmyard manure residues, last applied 1970:

NONE None
FYM 30 tonnes on each occasion

Sub plots

N Nitrogen fertilizer in 1988 (kg N) as 'Nitram':

0
50
100
150

NOTE: Because of an error nitrogen treatments were not fully factorial with **FYMRES70** on Highfield.

Standard applications:

1st Treatment crops:

All crops: Weedkiller: Paraquat at 0.60 kg ion in 200 l.
Lucerne: Manures: (0:24:24) at 310 kg.
All-grass ley and 1-year hay: Manures: (0:18:36) at 420 kg.
'Nitram' at 220 kg. (25:0:16) at 300 kg.
Clover-grass ley: Manures: (0:18:36) at 420 kg.

1st Test crop:

W. wheat: Manures: (0:24:24), combine drilled at 210 kg.
Weedkillers: Glyphosate at 1.4 kg in 500 l (to ex-lucerne, grass-ley and clover/grass ley plots only). Chlortoluron at 3.5 kg in 200 l. Fluroxypyr at 0.20 kg with isoproturon at 2.1 kg in 200 l.
Reseeded grass and old grass: Manures: (0:18:36) at 420 kg. All-grass half plots (25:0:16) at 300 kg in spring and after each cut except the last.

Seed: Lucerne: Vertus, sown at 31 kg.

All-grass ley: Meadow Fescue (17 kg) and Timothy Climax (17 kg), mixture sown at 34 kg.
Clover-grass ley: Meadow Fescue (4 kg), Timothy Climax (4 kg) and white clover (1 kg), mixture sown at 37 kg.
1-year hay: Londras Westerwolths Ryegrass, sown at 25 kg.
W. wheat: Avalon, sown at 180 kg.

88/R/RN/1 and 88/R/RN/2

Cultivations, etc.:-

1st Treatment crops:

All crops: Ploughed: 28 Sept, 1987. Paraquat applied: 11 Apr, 1988. Heavy spring-tine cultivated: 22 Apr.

Lucerne: PK applied: 11 May, 1988. Rotary harrowed, rolled, seed broadcast and harrowed in: 13 May. Cut: 18 Nov.

All-grass ley, clover-grass ley and 1-year hay: PK applied, N applied (except to clover-grass ley) and 1-year hay plots rotary harrowed and rolled: 11 May, 1988. All-grass ley and clover-grass ley plots rotary harrowed and rolled, all seed broadcast and harrowed in: 13 May. Cut: 18 July. NK applied (except to clover-grass ley): 21 July. Cut: 18 Nov.

1st Test crop wheat: Glyphosate applied (to ex-lucerne, grass-ley and clover/grass-ley plots): 19 Aug, 1987. Ploughed: 28 Sept. Rotary harrowed, PK applied, seed sown: 5 Oct. Chlortoluron applied: 6 Nov. N applied: 13 Apr, 1988. Fluroxypyr and isoproturon applied: 26 Apr. Combine harvested: 22 Aug.

Reseeded grass and old grass: PK applied: 12 Jan, 1988. NK applied to all-grass half plots: 5 Apr, 27 May, 21 July. Cut: 25 May, 18 July, 18 Nov.

88/R/RN/1 AND 88/R/RN/2

DRY MATTER: TONNES/HECTARE

***** Tables of means *****

	HIGHFIELD		FOSTERS			
CLOVER-GRASS LEY						
TOTAL OF 2 CUTS	3.48		3.15			
MEAN DM%	16.4		16.6			
ALL-GRASS LEY						
TOTAL OF 2 CUTS	6.31		5.59			
MEAN DM%	15.6		16.2			
LUCERNE						
1 CUT ONLY	0.69		1.79			
MEAN DM%	29.7		28.0			
HAY						
TOTAL OF 2 CUTS	5.31		5.58			
MEAN DM%	21.6		25.3			
OLD GRASS			HIGHFIELD			
TOTAL OF 3 CUTS	C		N			
40TH EXPTL YEAR						
BLOCKS 1 & 4	5.54		10.02			
BLOCK 2	5.41		10.68			
MEAN DM%	19.2		18.6			
RESEEDED GRASS						
TOTAL OF 3 CUTS						
	HIGHFIELD			FOSTERS		
	BLOCKS	C	N	BLOCKS	C	N
40TH EXPTL YEAR	1 & 4	5.48	10.69	1 & 3	6.57	11.16
40TH EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	5.04	12.02	2 & 4	6.45	10.15
MEAN DM%		18.5	18.9		18.9	21.0

88/R/RN/1 HIGHFIELD W.WHEAT (1ST TEST CROP)

GRAIN TONNES/HECTARE

***** Tables of means *****

	N	0	50	100	150
ROTATION	FYMRES70				
LUCERNE	NONE	7.20	7.63	8.00	6.63
	FYM	5.58	7.69	6.33	7.62
CLOGRA	NONE	4.81	7.68	6.38	6.45
	FYM	6.38	7.43	6.62	7.78
GRASS	NONE	4.28	5.97	5.63	6.03
	FYM	4.39	5.13	6.14	5.71
ARABLE	NONE	3.79	*	6.39	6.17
	FYM	*	5.62	6.58	5.88

GRAIN MEAN DM% 81.9

PLOT AREA HARVESTED 0.00663

88/R/RN/2 FOSTERS W.WHEAT (1ST TEST CROP)

GRAIN TONNES/HECTARE

***** Tables of means *****

FYMRES70	NONE	FYM	Mean
ROTATION			
LUCERNE	9.02	8.52	8.77
CLOGRA	8.01	8.26	8.13
GRASS	6.30	6.41	6.35
ARABLE	6.26	6.09	6.18
Mean	7.40	7.32	7.36

N	0	50	100	150	Mean
ROTATION					
LUCERNE	8.19	8.94	9.19	8.77	8.77
CLOGRA	6.73	8.29	9.14	8.38	8.13
GRASS	4.77	6.37	7.01	7.26	6.35
ARABLE	3.55	6.21	7.35	7.59	6.18
Mean	5.81	7.45	8.17	8.00	7.36

N	0	50	100	150	Mean
FYMRES70					
NONE	5.93	7.45	8.15	8.06	7.40
FYM	5.69	7.46	8.19	7.94	7.32
Mean	5.81	7.45	8.17	8.00	7.36

	N	0	50	100	150
ROTATION	FYMRES70				
LUCERNE	NONE	9.16	8.88	9.23	8.81
	FYM	7.23	9.01	9.14	8.73
CLOGRA	NONE	6.51	8.37	9.06	8.11
	FYM	6.95	8.22	9.22	8.65
GRASS	NONE	4.18	6.68	6.64	7.69
	FYM	5.36	6.06	7.37	6.83
ARABLE	NONE	3.86	5.85	7.68	7.62
	FYM	3.23	6.57	7.02	7.56

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED 0.00663