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Yields of the Field Experiments 1995

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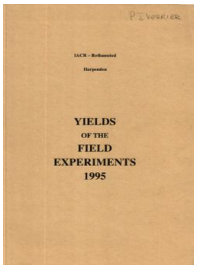

95/W/RN/3 Ley/ARABLE - Leys, W. Beans, W. Wheat, W. Rye, S. Barley

Rothamsted Research

Rothamsted Research (1996) *95/W/RN/3 Ley/ARABLE - Leys, W. Beans, W. Wheat, W. Rye, S. Barley ;* Yields Of The Field Experiments 1995, pp 36 - 45 **- DOI: https://doi.org/10.23637/ERADOC-1-50**

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95/W/RN/3

LEY/ARABLE

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

Sponsor: P.R. Poulton.

The 58th year, leys, w. beans, w. wheat, w. rye, s. barley.

For previous years see 'Details' 1967 & 1973 and 74-94/W/RN/3.

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

Whole plot dimensions: 8.53 x 40.7.

Treatments: All phases of four five-course rotations were originally present:

ROTATION

LEY	Clover/grass ley:	L, L, L, P, W
CLO	All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W

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

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

On four plots in each block arable rotations alternated each five years with ley rotations

From 1976 all the rotations were changed on all phases except for the first and second test crops in 1976:

LN 3	(Previous LEY) LN, LN, LN, W, R
LC 3	(Previous CLO) LC, LC, LC, W, R
AF	(Previous A) F, F, BE, W, R
AB	(Previous A H) B, B, BE, W, R

LN1 to LN3 = three year grass ley with N, 1st year to 3rd year, LC = clover/grass ley no N, BE = beans (s. oats until 1980), F = fallow

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95/W/RN/3

Plots hitherto in alternating rotations were changed to test eight-year leys:

LLN	LN, LN, LN, LN, LN, LN, LN, LN, W, R
LLC	LC, LC, LC, LC, LC, LC, LC, LC, W, R

LLN1 to LLN8 = eight year grass ley with N, first year to eighth year, similarly for LLC

The new scheme started by sowing these new leys in spring 1976 on four phases and in spring 1977 on the fifth phase (2nd test crop in 1976).

In 1992 w. rye (R) replaced s. barley (B) as the second test crop.

Yields are taken only from the leys and the test crops.

Treatments to first test crop w. wheat, all combinations of:

Whole plots

1. **ROTATION** Rotations:

   LN 8
   LN 3
   LC 8
   LC 3
   AF
   AB

1/2 plots

2. **FYMRES64** Farmyard manure residues, last applied 1964:

   NONE
   FYM 38 t on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 27% N:

   0
   70
   140
   210

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95/W/RN/3

Treatments to second test crop w. rye, all combinations of:

Whole plots

1. **ROTATION** Rotations:

   LN 8
   LN 3
   LC 8
   LC 3
   AF
   AB

1/2 plots

2. **FYMRES63** Farmyard manure residues, last applied 1963:

   NONE
   FYM 38 t on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 27% N:

   0
   30
   60
   90

Treatments to leys:

FYM RES Farmyard manure residues:

NONE
FYM 38 t on each occasion, last applied 1962 to 1st and 6th year leys, 1966 to 2nd and 7th year leys, 1965 to 3rd and 8th year leys, 1964 to 4th year leys, 1963 to 5th year leys

Corrective K dressings (kg K_2O) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block, applied: 5 Oct, 1994:

Continuous rotations	No FYM half plots	FYM half plots
LN	0	0
LC	0	0
AF	420	420
AB	420	420

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95/W/RN/3

Ex-alternating rotations		
LN 8 ploughed for w. wheat	0	0
LN 8 not ploughed	0	0
LC 8 ploughed for w. wheat	0	0
LC 8 not ploughed	0	0

Experimental diary:

Treatment crops:

Grass ley and clover/grass ley, 1st year (**ROTATION** LN1, LC1, LLN1 and LLC1):

30-Aug-94 : **T** : Roundup Biactive at 4.0 l in 200 l.
05-Sep-94 : **T** : Ploughed.
23-Sep-94 : **T** : LN1 and LLN1 only: 27% N at 278 kg, rotary harrowed, 50% Rossa meadow fescue and 50% Erecta Timothy mixture drilled at 30 kg.
: **T** : LC1 and LLC1 only: 27% N at 185 kg, rotary harrowed, 40% Rossa meadow fescue, 48% Erecta RVP Timothy and 12% Huia white clover mixture drilled at 30 kg.
06-Apr-95 : **T** : Rolled.
12-Apr-95 : **T** : PK as (0:20:32) at 469 kg.
: **T** : LN1 and LLN1 only: NK as 25:0:16 at 300 kg.
: **T** : LC1 and LLC1 only: Muriate of potash at 80 kg.
13-Jun-95 : **T** : First cut.
15-Jun-95 : **T** : Produce removed.
19-Jun-95 : **T** : LN1 and LLN1 only: NK as (25:0:16) at 300 kg.
: **T** : LC1 and LLC1 only: Muriate of potash at 80 kg.
19-Dec-95 : **T** : Second cut.

Grass leys, 2nd to 8th years (**ROTATION** LN2-3, LLN2-8):

04-Oct-94 : **T** : LLN5 only: Dolomite at 5.0 t.
05-Apr-95 : **T** : Chain harrowed.
06-Apr-95 : **T** : Rolled.
12-Apr-95 : **T** : PK as (0:20:32) at 469 kg, NK as (25:0:16) at 300 kg.
13-Jun-95 : **T** : First cut.
15-Jun-95 : **T** : Produce removed.
19-Jun-95 : **T** : NK as (25:0:16) at 300 kg.
19-Dec-95 : **T** : Second cut.

Clover/grass leys, 2nd to 8th years (**ROTATION** LC2-3 and LLC2-8):

04-Oct-94 : **T** : LLC5 only: Dolomite at 5.0 t.
05-Apr-95 : **T** : Chain harrowed.
06-Apr-95 : **T** : Rolled.
12-Apr-95 : **T** : PK as (0:20:32) at 469 kg, muriate of potash at 80 kg.
13-Jun-95 : **T** : First cut.
15-Jun-95 : **T** : Produce removed.
19-Jun-95 : **T** : Muriate of potash at 80 kg.
19-Dec-95 : **T** : Second cut.

S. barley, 1st and 2nd treatment crops (**ROTATION** AB):

30-Aug-94 : **T** : Roundup Biactive at 4.0 l in 200 l.
05-Sep-94 : **T** : 1st treatment crop only: Ploughed.
21-Mar-95 : **T** : 2nd treatment crop only: Ploughed.
24-Mar-95 : **T** : NPK applied as (20:10:10) at 400 kg. Rotary harrowed, Alexis, dressed Baytan, drilled at 350 seeds per m^2.
02-Jun-95 : **T** : Ally at 30 g with Starane 2 at 0.5 l in 300 l.
07-Aug-95 : **T** : Combine harvested.

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Experimental diary:

W. beans, 3rd treatment crop (**ROTATION** AF and AB):

30-Aug-94 : **T** : AB only: Roundup Biactive at 4.0 l in 200 l.
06-Oct-94 : **T** : PK as (0:24:24) at 168 kg. Punch broadcast at 16 seeds per m^2, ploughed.
02-Jun-95 : **T** : Rovral Flo at 2.0 l in 300 l.
07-Aug-95 : **T** : Combine harvested.

Fallow, 1st and 2nd treatment years (**ROTATION** AF):

30-Aug-94 : **T** : 1st year only: Roundup Biactive at 4.0 l in 200 l.
05-Sep-94 : **T** : 1st year only: Ploughed.
21-Mar-95 : **T** : 2nd year only: Ploughed.
06-Jun-95 : **T** : Rotary cultivated.
19-Jul-95 : **T** : Spiked rotary cultivated.

W. wheat, 1st test crop (W):

26-Sep-94 : **T** : Barclay Gallup at 4.0 l in 200 l.
05-Oct-94 : **T** : Ploughed.
06-Oct-94 : **T** : PK applied as (0:24:24) at 260 kg. Yaltox at 150 kg, rotary harrowed, Mercia, dressed Rappor, drilled at 300 seeds per m^2, rolled.
28-Nov-94 : **T** : Panther at 2.0 l with Decis at 200 ml in 200 l.
25-Apr-95 : **T** : **N** 70, 140 and 210: Applied as 27% N.
28-Apr-95 : **T** : Halo at 2.0 l in 200 l.
01-Jun-95 : **T** : Cyclone at 1.0 l with Mallard 750EC at 0.3 l in 200 l.
29-Jun-95 : **T** : Pirimicarb 50 DG at 280 g in 300 l.
04-Aug-95 : **T** : Combine harvested.

W. rye, 2nd test crop (R):

30-Aug-94 : **T** : Roundup Biactive at 4.0 l in 200 l.
05-Sep-94 : **T** : Ploughed.
04-Oct-94 : **T** : Dolomite at 5 t.
06-Oct-94 : **T** : PK as (0:24:24) at 260 kg, Yaltox at 150 kg. Rolled, harrowed.
11-Oct-94 : **T** : Rotary harrowed, Amando, dressed Cerevax, drilled at 400 seeds per m^2.
25-Apr-95 : **T** : **N** 30, 60 and 90: Applied as 27% N.
28-Apr-95 : **T** : Punch C at 0.625 l with Calixin at 0.35 l and Starane 2 at 1.0 l in 200 l.
29-Jun-95 : **T** : Pirimicarb 50 DG at 280 g in 300 l.
07-Aug-95 : **T** : Combine harvested.

NOTE: Samples of grass, clover/grass, wheat and rye grain were taken for chemical analysis.

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95/W/RN/3

LEYS

1ST CUT (13/6/95) DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	2.12	2.09	2.11
LC2	5.19	5.50	5.35
LC3	4.40	4.30	4.35
LN1	4.55	4.43	4.49
LN2	5.89	5.74	5.82
LN3	4.01	4.00	4.01
LLC1	1.22	1.47	1.35
LLC2	5.17	5.01	5.09
LLC3	4.30	4.03	4.16
LLC4	3.12	2.82	2.97
LLC5	4.03	3.89	3.96
LLC6	4.90	4.63	4.77
LLC7	4.51	4.72	4.62
LLC8	3.90	4.34	4.12
LLN1	4.14	4.65	4.40
LLN2	6.32	6.30	6.31
LLN3	4.48	4.60	4.54
LLN4	3.69	5.00	4.35
LLN5	4.66	4.26	4.46
LLN6	6.00	5.85	5.92
LLN7	4.14	4.99	4.56
LLN8	5.63	5.63	5.63
Mean	4.38	4.47	4.42

1ST CUT MEAN DM% 23.7

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95/W/RN/3

LEYS

2ND CUT (19/12/95) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	0.37	0.56	0.47
LC2	0.92	1.10	1.01
LC3	0.00	0.00	0.00
LN1	0.67	0.62	0.65
LN2	1.03	1.01	1.02
LN3	0.00	0.00	0.00
LLC1	0.30	0.43	0.36
LLC2	1.15	1.05	1.10
LLC3	0.15	0.62	0.38
LLC4	0.14	0.14	0.14
LLC5	0.60	0.55	0.58
LLC6	0.41	0.85	0.63
LLC7	0.56	0.61	0.59
LLC8	0.00	0.00	0.00
LLN1	0.67	1.04	0.86
LLN2	1.78	2.39	2.08
LLN3	0.41	0.27	0.34
LLN4	0.06	0.08	0.07
LLN5	0.68	0.73	0.70
LLN6	0.79	0.49	0.64
LLN7	0.25	0.25	0.25
LLN8	0.00	0.00	0.00
Mean	0.50	0.58	0.54

2ND CUT MEAN DM% 17.2

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LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	2.50	2.65	2.57
LC2	6.11	6.61	6.36
LC3	4.40	4.30	4.35
LN1	5.22	5.05	5.14
LN2	6.91	6.75	6.83
LN3	4.01	4.00	4.01
LLC1	1.52	1.90	1.71
LLC2	6.32	6.06	6.19
LLC3	4.45	4.65	4.55
LLC4	3.26	2.96	3.11
LLC5	4.63	4.44	4.54
LLC6	5.32	5.48	5.40
LLC7	5.07	5.33	5.20
LLC8	3.90	4.34	4.12
LLN1	4.82	5.69	5.25
LLN2	8.09	8.69	8.39
LLN3	4.89	4.87	4.88
LLN4	3.75	5.08	4.41
LLN5	5.33	4.99	5.16
LLN6	6.79	6.33	6.56
LLN7	4.39	5.24	4.82
LLN8	5.63	5.63	5.63
Mean	4.88	5.05	4.96

TOTAL OF 2 CUTS MEAN DM% 20.4

PLOT AREA HARVESTED 0.00200

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95/W/RN/3

W. WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES64	NONE	FYM	Mean
ROTATION			
LN 8	4.66	5.40	5.03
LN 3	4.53	4.65	4.59
LC 8	6.01	5.29	5.65
LC 3	5.46	4.79	5.13
AF	3.73	3.59	3.66
AB	3.91	3.20	3.55
Mean	4.72	4.49	4.60

N	0	70	140	210	Mean
ROTATION					
LN 8	2.52	5.71	5.36	6.53	5.03
LN 3	2.17	5.01	5.39	5.79	4.59
LC 8	3.52	6.60	6.36	6.14	5.65
LC 3	2.57	5.70	6.46	5.78	5.13
AF	1.27	3.82	4.60	4.96	3.66
AB	1.30	4.21	4.35	4.35	3.55
Mean	2.22	5.17	5.42	5.59	4.60

N	0	70	140	210	Mean
FYMRES64					
NONE	2.17	5.24	5.59	5.88	4.72
FYM	2.28	5.11	5.25	5.30	4.49
Mean	2.22	5.17	5.42	5.59	4.60

	N	0	70	140	210
ROTATION	**FYMRES64**				
LN 8	NONE	1.92	5.61	4.61	6.51
	FYM	3.12	5.81	6.10	6.56
LN 3	NONE	2.02	5.07	5.41	5.63
	FYM	2.32	4.95	5.37	5.94
LC 8	NONE	3.72	7.04	6.61	6.68
	FYM	3.32	6.16	6.11	5.59
LC 3	NONE	2.95	5.89	6.87	6.14
	FYM	2.19	5.51	6.05	5.42
AF	NONE	1.04	3.72	5.33	4.84
	FYM	1.50	3.92	3.86	5.08
AB	NONE	1.38	4.08	4.68	5.49
	FYM	1.22	4.33	4.01	3.22

GRAIN MEAN DM% 90.2

PLOT AREA HARVESTED 0.00183

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95/W/RN/3

W. RYE 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	Mean
ROTATION			
LN 8	5.35	4.91	5.13
LN 3	5.25	4.75	5.00
LC 8	4.59	4.69	4.64
LC 3	4.50	4.80	4.65
AF	3.15	3.01	3.08
AB	3.09	3.03	3.06
Mean	4.32	4.20	4.26

N	0	30	60	90	Mean
ROTATION					
LN 8	3.24	4.10	5.80	7.37	5.13
LN 3	3.50	4.15	5.68	6.69	5.00
LC 8	3.27	4.20	5.06	6.03	4.64
LC 3	2.99	4.70	5.21	5.71	4.65
AF	1.50	1.99	4.03	4.81	3.08
AB	1.36	2.74	3.57	4.56	3.06
Mean	2.64	3.65	4.89	5.86	4.26

N	0	30	60	90	Mean
FYMRES63					
NONE	2.65	3.62	5.12	5.90	4.32
FYM	2.63	3.67	4.66	5.82	4.20
Mean	2.64	3.65	4.89	5.86	4.26

N		0	30	60	90
ROTATION	**FYMRES63**				
LN 8	NONE	3.24	4.43	6.66	7.05
	FYM	3.23	3.76	4.94	7.69
LN 3	NONE	3.35	4.38	6.17	7.12
	FYM	3.65	3.92	5.19	6.26
LC 8	NONE	3.41	3.98	5.06	5.93
	FYM	3.13	4.42	5.06	6.14
LC 3	NONE	2.90	4.26	5.18	5.67
	FYM	3.07	5.14	5.25	5.75
AF	NONE	1.48	2.29	3.67	5.17
	FYM	1.53	1.68	4.39	4.46
AB	NONE	1.53	2.37	3.98	4.47
	FYM	1.19	3.12	3.16	4.65

GRAIN MEAN DM% 88.2

PLOT AREA HARVESTED 0.00183

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