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Yields of the Field Experiments 1999

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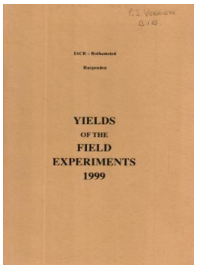

99/W/RN/3 Ley/ARABLE - Leys, W. Beans, W. Wheat, W. Rye, Forage Maize

Rothamsted Research

Rothamsted Research (2000) *99/W/RN/3 Ley/ARABLE - Leys, W. Beans, W. Wheat, W. Rye, Forage Maize ;* Yields Of The Field Experiments 1999, pp 36 - 45 **- DOI: https://doi.org/10.23637/ERADOC-1-34**

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99/R/GC/8

1ST CUT (28/5/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	5.54	4.66	5.10

1ST CUT MEAN DM% 17.7

2ND CUT (16/7/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	5.95	5.57	5.76

2ND CUT MEAN DM% 18.6

3RD CUT (14/10/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	3.66	2.76	3.21

3RD CUT MEAN DM% 25.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	15.15	12.99	14.07

TOTAL OF 3 CUTS MEAN DM% 20.5

PLOT AREA HARVESTED 0.00010

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99/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 62nd year, leys, w. beans, w. wheat, w. rye, forage maize.

For previous years see 'Details' 1967 & 1973 and 74-98/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) LN1, LN2, LN3, W, R
LC 3	(Previous CLO) LC1, LC2, LC3, W, R
AF	(Previous A) F, F, BE, W, R
AB	(Previous A H) B, B, BE, W, R

From 1998 rotations AF and AB are replaced by AM and ABe respectively. Phased in at the beginning of each treatment crop sequence.

ABe	R, M, BE, W, R
AM	R, BE, M, W, R

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99/W/RN/3

ROTATION (continued)

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,
M = forage maize

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

LLN	LLN1, LLN2, LLN3, LLN4, LLN5, LLN6, LLN7, LLN8, W, R
LLC	LLC1, LLC2, LLC3, LLC4, LLC5, LLC6, LLC7, LLC8, W, R

LLN1 to LLN8 = eight year grass ley with nitrogen, first year to eighth year, similarly for LLC - clover/grass ley, no nitrogen

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, forage maize and the test crops.

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

Whole plots:

1. **ROTATION** Rotations before wheat:

   LLN 8
   LN 3
   LLC 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 in spring 1999 (kg N) as 27% N:

   0
   70
   140
   210

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99/W/RN/3

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

Whole plots:

1. **ROTATION** Rotations before first test crop:

   LLN 8
   LN 3
   LLC 8
   LC 3
   AF
   AB

1/2 plots:

2. **FYMRES62** Farmyard manure residues, last applied 1962:

   NONE
   FYM 38 t on each occasion

1/8 plots:

3. **N** Nitrogen fertilizer in spring 1999 (kg N) as 27% N:

   0
   40
   80
   120

Treatments to leys:

FYM RES Farmyard manure residues:

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

NOTE: 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 01-Sep-98:

Continuous rotations before wheat	No FYM half plots	FYM half plots
AF	300	300
AB	300	300

None to other plots.

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99/W/RN/3

Experimental diary:

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

01-Sep-98 : **T** : Ploughed.
14-Sep-98 : **T** : LC1 and LLC1 only: 27% N at 185 kg.
: **T** : LN1 and LLn1 only: 27% N at 278 kg.
: **T** : Cambridge rolled, rotary harrowed.
20-Sep-98 : **T** : LC1 and LLC1 only: Grass/clover mixture drilled 30 kg.
: **T** : LN1 and LLN1 only: Grass mixture drilled 30 kg.
24-Sep-98 : **T** : Cambridge Rolled.
18-Mar-99 : **T** : LC1 and LLC1 only: Muriate of potash at 330 kg and triple superphosphate at 204 kg.
: **T** : LN1 and LLN1 only: Muriate of potash at 250 kg and triple superphosphate at 204 kg. NK as (24:0:16) at 313 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
: **T** : LN1 and LLN1 only: 27% N at 278 kg
26-Oct-99 : **T** : Second cut.

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

08-Feb-99 : **T** : Topped.
18-Mar-99 : **T** : Muriate of potash at 250 kg and triple superphosphate at 204 kg. NK as (24:0:16) at 313 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
: **T** : 27% N at 278 kg.
26-Aug-99 : **T** : LN3 and LLN8 only: Second cut
26-Oct-99 : **T** : Remaining leys: Second cut.

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

08-Feb-99 : **T** : Topped.
18-Mar-99 : **T** : Muriate of potash at 330 kg and triple superphosphate at 204 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
26-Aug-99 : **T** : LC3 and LLC8 only: Second cut
26-Oct-99 : **T** : Remaining leys: Second cut.

W. beans, 2nd and 3rd treatment crop (**ROTATION** AB, AF, ABe and AM):

19-Sep-98 : **T** : PK as (0:24:24) at 168 kg.
03-Dec-98 : **T** : Punch broadcast at 25 seed/m^2. Ploughed.
07-Dec-98 : **T** : Rotary harrowed.
25-May-99 : **T** : Ronilan FL at 0.5 l with Sipcam UK Rover 500 at 2.0 l in 200 l.
09-Jun-99 : **T** : Ronilan FL at 0.5 l with Sipcam UK Rover 500 at 2.0 l, Aphox at 100 g, Hallmark at 100 ml and Vytel Manganese at 3.0 l in 200 l.
23-Aug-99 : **T** : Combine harvested.

Forage maize, 2nd treatment crop (**ROTATION** ABe):

01-Sep-98 : **T** : Ploughed.
14-Sep-98 : **T** : Cambridge rolled.
06-May-99 : **T** : Rotary harrowed. Orient, tr. Mesurol, drilled at 11 seeds/m^2 with the Nodet Gougis drill.
24-Jun-99 : **T** : Gesaprim at 3.0 l with Cropoil at 5.0 l in 220 l.

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99/W/RN/3

Experimental diary:

Forage maize, 2nd treatment crop (**ROTATION** ABe):

30-Jun-99 : **T** : PK as (0:24:24) at 167 kg and muriate of potash at 40 kg. 27% N at 370 kg.

21-Sep-99 : **T** : Cut.

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

01-Sep-98 : **T** : Ploughed.

14-Sep-98 : **T** : Cambridge rolled.

19-Sep-98 : **T** : PK as (0:24:24) at 260 kg.

12-Oct-98 : **T** : Rotary harrowed, Hereward, tr. Sibutol, drilled at 380 seeds/m^2 with the Accord drill.

25-Feb-99 : **T** : Platform S at 1.0 kg with Isoguard at 2.0 l in 200 l.

12-Apr-99 : **T** : **N** 70, 140, 210: N applied as 27% N.

25-Apr-99 : **T** : Folicur at 0.5 l with Tripart Brevis at 2.0 l in 200 l.

27-May-99 : **T** : Folicur at 0.75 l with Sipcam UK Rover 500 at 1.0 l in 200 l.

22-Aug-99 : **T** : Combine harvested.

W. rye, 2nd test crop (R) and 1st treatment crop (**ROTATION** ABe and AM):

01-Sep-98 : **T** : Ploughed.

14-Sep-98 : **T** : Cambridge rolled.

19-Sep-98 : **T** : R only: PK as (0:24:24) at 260 kg.

: **T** : ABe and AM only: PK as (0:24:24) at 167 kg.

15-Oct-98 : **T** : ABe and AM only: 27% N at 296 kg.

: **T** : Rotary harrowed, Esprit, tr. Baytan Flowable, drilled at 300 seeds/m^2 with the Accord drill.

04-Mar-99 : **T** : Quantum at 30 g in 200 l.

13-Apr-99 : **T** : R only: **N** 40, 80, 120: N applied as 27% N.

23-Apr-99 : **T** : ABe and AM only: NPK as (20:10:10) at 400kg.

25-Apr-99 : **T** : Folicur at 0.5 l with Tripart Brevis at 2.0 l in 200 l.

16-May-99 : **T** : Folicur at 1.0 l in 200 l.

22-Aug-99 : **T** : Combine harvested.

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99/W/RN/3

LEYS

1ST CUT (21/6/99) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	3.35	2.78	3.06
LC2	6.79	7.22	7.01
LC3	5.79	6.27	6.03
LN1	5.74	5.35	5.54
LN2	8.57	9.29	8.93
LN3	5.93	6.04	5.99
LLC1	4.59	4.25	4.42
LLC2	7.22	6.67	6.94
LLC3	4.73	4.82	4.77
LLC4	3.50	4.42	3.96
LLC5	5.77	6.13	5.95
LLC6	5.82	4.63	5.23
LLC7	5.77	4.98	5.38
LLC8	2.97	2.28	2.62
LLN1	6.95	7.17	7.06
LLN2	10.19	8.53	9.36
LLN3	7.37	7.13	7.25
LLN4	7.13	6.92	7.02
LLN5	6.32	7.60	6.96
LLN6	7.18	7.31	7.24
LLN7	5.34	5.00	5.17
LLN8	6.68	5.77	6.22
Mean	6.08	5.93	6.01

1ST CUT MEAN DM% 29.5

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99/W/RN/3 LEYS

2ND CUT (26/08/99 AND 27/10/99) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	1.88	1.56	1.72
LC2	1.92	2.18	2.05
LC3	1.21	1.65	1.43
LN1	1.53	2.05	1.79
LN2	2.67	4.80	3.74
LN3	1.09	0.96	1.02
LLC1	1.45	1.38	1.41
LLC2	2.22	1.62	1.92
LLC3	1.03	1.08	1.05
LLC4	0.54	0.48	0.51
LLC5	1.44	1.15	1.30
LLC6	1.72	0.87	1.29
LLC7	1.20	1.60	1.40
LLC8	0.41	0.60	0.51
LLN1	2.04	2.14	2.09
LLN2	2.20	2.95	2.57
LLN3	1.66	1.87	1.76
LLN4	1.51	1.75	1.63
LLN5	1.94	2.19	2.07
LLN6	2.05	1.56	1.81
LLN7	2.22	1.43	1.82
LLN8	1.86	1.82	1.84
Mean	1.63	1.71	1.67

2ND CUT MEAN DM% 20.0

NOTE: LN3, LLN8, LL3 and LLC8 cut on first date remainder on second date.

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99/W/RN/3 LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	5.23	4.33	4.78
LC2	8.71	9.40	9.06
LC3	6.99	7.91	7.45
LN1	7.26	7.40	7.33
LN2	11.24	14.09	12.67
LN3	7.02	7.00	7.01
LLC1	6.04	5.63	5.83
LLC2	9.44	8.28	8.86
LLC3	5.75	5.89	5.82
LLC4	4.04	4.90	4.47
LLC5	7.22	7.28	7.25
LLC6	7.54	5.50	6.52
LLC7	6.97	6.58	6.78
LLC8	3.38	2.88	3.13
LLN1	8.99	9.31	9.15
LLN2	12.39	11.48	11.93
LLN3	9.02	8.99	9.01
LLN4	8.64	8.67	8.65
LLN5	8.26	9.80	9.03
LLN6	9.23	8.88	9.05
LLN7	7.56	6.43	6.99
LLN8	8.54	7.59	8.07
Mean	7.70	7.65	7.67

TOTAL OF 2 CUTS MEAN DM% 24.7

PLOT AREA HARVESTED 0.00200

MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

FYMRES	NONE	FYM	Mean
	6.93	8.38	7.66

GRAIN MEAN DM% 26.3

PLOT AREA HARVESTED 0.00054

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99/W/RN/3

W. WHEAT

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	Mean
ROTATION			
LLN 8	6.01	6.38	6.19
LN 3	5.84	6.00	5.92
LLC 8	4.52	3.94	4.23
LC 3	7.36	7.58	7.47
AF	5.61	5.93	5.77
AB	2.21	1.63	1.92
Mean	5.26	5.24	5.25

N	0	70	140	210	Mean
ROTATION					
LLN 8	3.42	6.59	8.26	6.51	6.19
LN 3	1.69	6.58	7.58	7.83	5.92
LLC 8	1.79	4.65	5.54	4.95	4.23
LC 3	4.42	7.27	8.65	9.54	7.47
AF	0.52	6.55	7.53	8.48	5.77
AB	0.00	1.97	3.44	2.28	1.92
Mean	1.97	5.60	6.83	6.60	5.25

N	0	70	140	210	Mean
FYMRES63					
NONE	1.91	5.59	6.94	6.61	5.26
FYM	2.04	5.62	6.73	6.58	5.24
Mean	1.97	5.60	6.83	6.60	5.25

N		0	70	140	210
ROTATION	**FYMRES63**				
LLN 8	NONE	4.45	5.34	8.84	5.42
	FYM	2.38	7.85	7.68	7.59
LN 3	NONE	1.44	7.21	7.32	7.40
	FYM	1.93	5.96	7.84	8.26
LLC 8	NONE	1.71	4.91	5.07	6.40
	FYM	1.87	4.39	6.01	3.50
LC 3	NONE	3.83	7.13	8.90	9.59
	FYM	5.01	7.41	8.40	9.48
AF	NONE	0.00	6.11	7.78	8.57
	FYM	1.05	7.00	7.29	8.39
AB	NONE	0.00	2.82	3.73	2.28
	FYM	0.00	1.11	3.15	2.27

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00183

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