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# Yields of the Field Experiments 2020

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## 20/W/RN/3 Ley/ARABLE (Stackyard D, Woburn Farm)

### Rothamsted Research

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Results of the Classics and other Long-term Experiments 2020

20/W/RN/3

20/W/RN/3 LEY/ARABLE (Stackyard D, Woburn Farm)

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

The 83<sup>rd</sup> year, leys, winter beans, winter wheat, winter rye

For previous years see 'Details' 1967 & 1973 and Yield Books for 74-19/W/RN/3.

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

**Whole plot dimensions:** 8.53 m × 40.7 m

**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, WINTER
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, WINTER
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, WINTER

P = potatoes, R = winter rye, C = carrots, W = winter wheat, B = spring 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 every 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:

Ln3	(Previous LEY) LN1, LN2, LN3, W, R
Lc3	(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 1988 rotations AF and AB are replaced by AM and ABe respectively.  
Phased in at the beginning of each treatment crop sequence.

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

Ln1 to Ln3 = three-year grass ley with N, 1<sup>st</sup> year to 3<sup>rd</sup> year,  
Lc = clover/grass ley, no N, Be = beans (spring oats until 1980), F = fallow,  
M = forage maize

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

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 leys 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 (2<sup>nd</sup> test crop in 1976).

In 1992 winter rye (R) replaced spring barley (B) as the second test crop. Yields are taken from the leys, arable treatment crops and the test crops.

From 2007 plots previously in the 1<sup>st</sup> cycle of testing eight-year leys followed by two arable test crops (i.e. those plots which were changed to eight-year ley treatments in 1976 or 1977) changed to a three-year arable rotation followed by two arable test crops. Plots were “phased in” but joined the relevant point in the rotation. From 2008 the second cycle 8-yr grass and grass/clover leys changed to 3-yr grass or grass/clover leys respectively. They were phased in between 2008 and 2012.

LLn/AO (Previously 1<sup>st</sup> cycle, 8-yr grass ley) R, Be, O, W, R

LLc/ABe (Previously 1<sup>st</sup> cycle, 8-yr grass/clover ley) R, O, Be, W, R

LLc/Lc3 (Previously 2<sup>nd</sup> cycle, 8-yr grass ley) Lc 1, Lc 2, Lc 3, W, R

LLn/Ln3 (Previously 2<sup>nd</sup> cycle, 8-yr grass/clover ley) Ln 1, Ln 2, Ln 3, W, R

From 2009 W oats (O) replaced forage maize (M) in the AM and ABe rotations on block III and were phased in on blocks V, IV, II and I in subsequent years. The AM treatment was re-named AO. The new rotations were fully in phase by 2016.

**Treatments to first test crop winter wheat, all combinations of:**

**Whole plots:**

1. **ROTATION**                      Rotations before wheat:
  - LLn 8
  - Ln 3
  - LLc 8
  - Lc 3
  - LLc/Lc3
  - LLn/Ln3
  - LLn/AO
  - LLc/ABe
  - AM/AO
  - ABe1/ 2 plots:
2. **NSPLIT (FYM res)**              Farmyard manure residues, last applied 1960s:
  - Split N v single N dressing to wheat, tested 2001-5
  - Nsplit (noFYM)
  - Nsingle (FYM)

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1/8 plots:

3. **N** Nitrogen fertilizer as split dressings in spring 2020  
(kg N) as 34.5% N:

0	0	
80	40 + 40	) to be applied
160	40 + 120	) late-February/early-March
240	40 + 200	) and mid-April

**Treatments to second test crop winter rye, all combinations of:**

**Whole plots:**

1. **ROTATION** Rotations before first test crop:  
LLn8

Ln 3

LLc 8

Lc 3

LLc/Lc3 not yet in phase

LLn/Ln3 not yet in phase

LLn/AO not yet in phase

LLc/ABe not yet in phase

AM/AO

ABe

1/ 2 plots:

2. **NSPLIT (FYM res)** Farmyard manure residues, last applied 1960s:  
N split to wheat (no FYM)

N single to wheat (FYM)

1/8 plots:

3. **N** Nitrogen fertilizer in spring 2020 (kg N) as 34.5%:

0

50

100

150

Treatments to leys:

**FYM RES** Farmyard manure residues:

NONE

FYM 38 t on each occasion, last applied 1960s.

Results of the Classics and other Long-term Experiments 2020

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**NOTE:** Corrective K dressings (kg K<sub>2</sub>O ha<sup>-1</sup>) as muriate of potash, applied where necessary to first test crop winter wheat and long-term leys in the wheat block, applied 2019 (see date below).

Continuous rotations	No FYM	FYM Res
Before wheat	Half plots	Half plots
ABe/Be	280	260
AO/O	260	380
LLn/AO	310	240
LLn/Ln3	-	60
Ln3	130	110
LLc/ABe	200	90
None to other plots.		

## Experimental Diary

Date		Application	Rate	Units
<b>ALL</b>				
10/10/2019	a	Power harrow; JD6620 with Kuhn Powerharrow 3m		
22/10/2019	s	Drilled winter oats, var: Miscani; JD6620 with Accord 4m Tyne Drill	350	seeds/m <sup>2</sup>
08/11/2019	a	Topped. Stackyard; Topper 9		
02/12/2019	p	Sprayed Hallmark with Zeon Technology; MF6150 with Knight Sprayer	50	ml/ha
02/12/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	2	l/ha
02/07/2020	a	Mowed Grass Trails; JD6620 with Mower-Unifarm CM166	-	-
15/09/2020	a	Harvested all plots. No problems with harvest. No yields from bean plots as plots failed.; Haldrup C-85		
15/09/2020	a	Harvested odds and ends of plots. Harvested areas of plots left after taking yield cut.; Haldrup C-85		
<b>Grass ley and clover/grass leys (first year leys)</b>				
20/06/2019	p	Sprayed Cello; MF6150 with Knight Sprayer	1.25	l/ha
08/10/2019	p	Spreading SOP; JD6930 Cascade Spreader	140	kg/ha
31/03/2020	f	Applied Nitram (34.5 % N); Plots 57, 58, 61, 62; JD6620 with Cascade Spreader	25	kg/ha

Results of the Classics and other Long-term Experiments 2020			20/W/RN/3
31/03/2020	f	Applied Nitram (34.5 % N); Plots 55, 56, 59, 60; JD6620 with Cascade Spreader	50 kg/ha
30/03/2020	a	Chisel plough - 1st year grass plots; JD6620 with Chisel Plough	- -
17/04/2020	f	Applied TSP; Block 4 (Plots 55-62); JD6620 with Cascade Spreader	213 kg/ha
17/04/2020	f	Applied MOP; Blocks 4 (Plots 55-62); JD6620 with Cascade Spreader	167 kg/ha
17/04/2020	f	Applied Nitram (34.5 % N); Block 4 (57, 58, 61, 62); JD6620 with Cascade Spreader	217 kg/ha
20/04/2020	f	Applied SOP; Block 4 (Plots 55-62); Applied late due to late sowing of grass ; JD6620 with Cascade Spreader	140 kg/ha
30/06/2020	a	Grass Plots 1st Cut; JD6620 with Wilder Grass Box	- -
02/07/2020	a	Row up grass. Grass plots; JD6620 with Tedder	- -
03/07/2020	a	Baling Grass. Grass plots; JD6620 with Claas Baler	- -
05/08/2020	f	Applied Nitram (34.5 % N); Plots 57, 58, 61, 62; JD6930 with Cascade Spreader	217 kg/ha
<b>Grass ley and clover/grass leys (2nd and 3rd year leys)</b>			
08/10/2019	f	Spreading SOP; JD6930 Cascade Spreader	140 kg/ha
17/04/2020	f	Applied TSP; Block 3 (Plots 33, 34, 37, 38, 41, 42, 43, 44), Block 5 (Plots 65, 66, 69, 70, 77, 78, 79, 80); JD6620 with Cascade Spreader	213 kg/ha
17/04/2020	f	Applied MOP; Blocks 3 (Plots 33, 34, 37, 38, 41-44), Block 5 (Plots 65, 66, 69, 70, 77-80); JD6620 with Cascade Spreader	167 kg/ha
17/04/2020	f	Applied Nitram (34.5 % N); Block 3 (Plots 37, 38, 43, 44), Block 5 (65, 66, 69, 70); JD6620 with Cascade Spreader	217 kg/ha
20/04/2020	f	Applied SOP; Block 3 (Plots 33, 34, 37, 38, 41, 42, 43, 44), Block 5 (Plots 65, 66, 69, 70, 77, 78, 79, 80); JD6620 with Cascade Spreader	150 kg/ha

Results of the Classics and other Long-term Experiments 2020			20/W/RN/3
30/06/2020	a	Grass Plots 1st Cut; JD6620 with Wilder Grass Box	- -
02/07/2020	a	Row up grass. Grass plots; JD6620 with Tedder	- -
03/07/2020	a	Baling Grass. Grass plots; JD6620 with Claas Baler	- -
05/08/2020	f	Applied Nitram (34.5 % N); Plots 37, 38, 43, 44, 65, 66, 69, 70; JD6930 with Cascade Spreader	217 kg/ha
<b>W Wheat</b>			
29/05/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	3 l/ha
08/10/2019	f	Spreading TSP; JD6930 Cascade Spreader	127 kg/ha
08/10/2019	f	Spreading SOP; JD6930 Cascade Spreader	150 kg/ha
09/10/2019	a	Ploughing; Thrown E; WES Dowdeswell 100 Series Five Furrow Plough	- -
10/10/2019	a	Power harrow; JD6620 with Kuhn Power harrow 3m	- -
22/10/2019	s	Drilled winter wheat, var: Crusoe; JD6620 with Accord 4m Tyne Drill	350 seeds/m <sup>2</sup>
02/12/2019	p	Sprayed Hallmark with Zeon Technology; MF6150 with Knight Sprayer	50 ml/ha
02/12/2019	p	Sprayed Liberator; MF6150 with Knight Sprayer	0.6 l/ha
02/12/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	2 l/ha
25/03/2020	p	Sprayed Palio; MF6150 with Knight Sprayer	0.265 kg/ha
25/03/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer	3 l/ha
06/04/2020	f	Applied Nitro-chalk (27 % N); Block 1; By Hand	148 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 11	60 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 16	90 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 13	110 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 14	130 kg/ha

Results of the Classics and other Long-term Experiments 2020			20/W/RN/3
09/04/2020	f	Applied MOP as Corrective K; Plot 15	200 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 10	240 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plots 1, 6	260 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 2	280 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 9	310 kg/ha
09/04/2020	f	Applied MOP as Corrective K; Plot 5	380 kg/ha
16/04/2020	f	Applied Nitro-chalk (27 % N); Block 1 (Plots 014, 021, 034, 043, 054, 061, 074, 084, 094, 102, 113, 123, 134, 143, 152, 163); By Hand	148 kg/ha
16/04/2020	f	Applied Nitro-chalk (27 % N); Block 1 (Plots 011, 023, 031, 042, 051, 063, 072, 081, 091, 103, 111, 121, 132, 142, 153, 162) ; By Hand	444 kg/ha
16/04/2020	f	Applied Nitro-chalk (27 % N); Block 1 (Plots 013, 022, 033, 044, 053, 062, 073, 083, 093, 101, 114, 124, 133, 144, 151, 164); By Hand	741 kg/ha
17/04/2020	f	Applied TSP; Block 1	150 kg/ha
20/04/2020	f	Applied SOP; Blocks 1; JD6620 with Cascade Spreader	150 kg/ha
09/05/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer	1 l/ha
09/05/2020	p	Sprayed Stefes CCC 72; MF6150 with Knight Sprayer	1 l/ha
09/05/2020	p	Sprayed Vortex; MF6150 with Knight Sprayer	1.5 l/ha
01/06/2020	p	Sprayed Azoxystar; MF6150 with Knight Sprayer	0.5 l/ha
01/06/2020	p	Sprayed Cello; MF6150 with Knight Sprayer	1.075 l/ha
01/06/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer	3 l/ha
<b>W Rye</b>			
07/10/2019	f	Spreading chalk; JD6620 (block 2, 2nd test crop only)	5 t/ha



Results of the Classics and other Long-term Experiments 2020			20/W/RN/3
08/10/2019	f	Spreading SOP; JD6930 Cascade Spreader	127 kg/ha
08/10/2019	f	Spreading TSP; JD6930 Cascade Spreader	kg/ha
09/10/2019	a	Ploughing; Thrown E; WES Dowdeswell 100 Series Five Furrow Plough	- -
10/10/2019	a	Power harrow; JD6620 with Kuhn Powerharrow 3m	- -
22/10/2019	s	Drilled winter rye, var: Mephisto; JD6620 with Accord 4m Tyne Drill	350 Seeds/m <sup>2</sup>
02/12/2019	p	Sprayed Liberator; MF6150 with Knight Sprayer	0.6 l/ha
02/12/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	2 l/ha
25/03/2020	p	Sprayed Palio; MF6150 with Knight Sprayer	0.265 kg/ha
25/03/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer	3 l/ha
31/03/2020	a	Rolled; JD6620 with Flexicoil Cambridge Roll	
16/04/2020	f	Applied Nitro-chalk (27% N); Block 2 (Plots 171, 182, 194, 204, 214, 223, 234, 241, 251, 263, 272, 283, 294, 303, 314, 321); By Hand	185 kg/ha
16/04/2020	f	Applied Nitro-chalk (27 % N); Block 2 (Plots 172, 184, 191, 202, 211, 222, 232, 243, 254 ,261, 273, 281, 291, 301, 313, 324); By Hand	370 kg/ha
16/04/2020	f	Applied Nitro-chalk (27 % N); Block 2 (Plots 173, 181, 192, 203, 213, 224, 233, 244, 253, 264, 271, 284, 293, 302, 312, 322); By Hand	556 kg/ha
17/04/2020	f	Applied Nitram (34.5 % N); Block 4 (Plots 49-52, 53-54, 63-64); JD6620 with Cascade Spreader	290 kg/ha
17/04/2020	f	Applied TSP; Block 2, Block4 (Plots 49-54, 63, 64); JD6620 with Cascade Spreader	150 kg/ha
17/04/2020	f	Applied MOP; Blocks 3, 4, 5 ; Plots 33, 34, 37, 38, 41-44, 55-60, 61, 62, 65, 66, 69, 70, 77-80; JD6620 with Cascade Spreader	167 kg/ha
20/04/2020	f	Applied SOP; Blocks 2; Block 4 (plots 49-54, 63, 64); JD6620 with Cascade Spreader	150 kg/ha

Results of the Classics and other Long-term Experiments 2020			20/W/RN/3
09/05/2020	p	Sprayed Vortex; MF6150 with Knight Sprayer	1.5 l/ha
<b>W Oats</b>			
29/05/2019	p	Sprayed Cello; MF6150 with Knight Sprayer	1.25 l/ha
20/06/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	2 l/ha
08/10/2019	f	Spreading SOP; JD6930 Cascade Spreader	150 kg/ha
08/10/2019	f	Spreading TSP; JD6930 Cascade Spreader	127 kg/ha
09/10/2019	a	Ploughing; Thrown E; WES Dowdeswell 100 Series Five Furrow Plough	
10/10/2019	a	Power harrow; JD6620 with Kuhn Powerharrow 3m	
22/10/2019	s	Drilled winter oats, var: Miscani; JD6620 with Accord 4m Tyne Drill	350 seeds/m <sup>2</sup>
02/12/2019	p	Sprayed Hallmark with Zeon Technology; MF6150 with Knight Sprayer	50 ml/ha
02/12/2019	p	Sprayed Sprinter; MF6150 with Knight Sprayer	2 l/ha
17/04/2020	f	Applied TSP; Block 3 (Plots 35, 36, 39, 40), Block 4 (67, 68, 75, 76); JD6620 with Cascade Spreader	150 kg/ha
17/04/2020	f	Applied Nitram (34.5 % N); Block 3 (Plots 35, 36, 39, 40), Block 5 (Plots 67, 68, 75, 76); JD6620 with Cascade Spreader	290 kg/ha
20/04/2020	f	Applied SOP; Block 3 (plots 35, 36, 39, 40), Block 5 (plots 67, 68, 75-76); JD6620 with Cascade Spreader	150 kg/ha
09/05/2020	p	Sprayed Presite SX; MF6150 with Knight Sprayer	60 g/ha
09/05/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer	1 l/ha
09/05/2020	p	Sprayed Vortex; MF6150 with Knight Sprayer	1 l/ha
01/06/2020	p	Sprayed Azoxystar; MF6150 with Knight Sprayer	0.8 l/ha

Results of the Classics and other Long-term Experiments 2020		20/W/RN/3
01/06/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer 3 l/ha
<b>Winter Beans</b>		
08/10/2019		Spreading SOP; JD6930 Cascade Spreader 150 kg/ha
08/10/2019		Spreading TSP; JD6930 Cascade Spreader 127 kg/ha
09/10/2019	a	Ploughing; Thrown E; WES Dowdeswell 100 Series Five Furrow Plough
10/10/2019		Power harrow; JD6620 with Kuhn Powerharrow 3m
22/10/2019	s	Drilled winter beans, var: Tundra; JD6620 with Accord 4m Tyne Drill 21 seeds/m <sup>2</sup>
25/03/2020	p	Sprayed Troy 48; MF6150 with Knight Sprayer 3 l/ha
15/04/2020	p	Sprayed Hallmark with Zeon Technology; MF6150 with Knight Sprayer 75 ml/ha
15/04/2020	p	Sprayed Laser; MF6150 with Knight Sprayer 1 l/ha
15/04/2020	p	Sprayed Sprinter; MF6150 with Knight Sprayer 2 l/ha
17/04/2020	f	Applied TSP; Block 3 (Plots 45-48), Block 4 (71-74); JD6620 with Cascade Spreader 150 kg/ha
20/04/2020	f	Applied SOP; Block 3 (Plots 45-48), Block 4 (71-74); JD6620 with Cascade Spreader 150 kg/ha

NOTE: Herbage and grain samples were taken for chemical analyses.

**Yield Error Note:** It was found that the FYM notation (dr) for some plots on Block 5 was incorrect in the 2020 field plan, and for several previous years (2003-2006, 2009). Consequently, the yield and plans for 2020 were corrected, but earlier yield books contain an error in some of the mean yields for FYM and NONE treatments.

## LEYS

1ST CUT (30 JUN 2020) DRY MATTER TONNES/HECTARE

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

FYM_RES	LEY	NONE	FYM	MEAN
	Lc1	1.05	1.08	1.07
	Lc2	4.89	5.43	5.16
	Lc3	0.81	0.94	0.87
	Ln1	0.90	0.71	0.80
	Ln2	4.87	5.13	5.00
	Ln3	4.35	3.84	4.10
	(LLc/Lc)Lc1	0.52	0.67	0.59
	(LLc/Lc)Lc2	4.93	4.37	4.65
	(LLc/Lc)Lc3	1.90	1.84	1.87
	(LLn/Ln)Ln1	0.39	0.69	0.54
	(LLn/Ln)Ln2	4.64	5.12	4.88
	(LLn/Ln)Ln3	2.67	3.13	2.90
	MEAN	2.66	2.75	2.70

1ST CUT MEAN DM% 33.50

**NO SECOND CUT WAS TAKEN IN 2020**

**Note 1:** No 2<sup>nd</sup> Cut of the first, second or third year leys (Lc3, Ln3, Lc3, (LLc/Lc)Lc3, (LLn/Ln)Ln3) was taken because the box mower was condemned on safety grounds.

**Note 2:** Since 2014 grass-only leys have not been receiving N after the first cut and in some years K has not been applied after the first cut on both grass-only and grass-clover leys.

**ARABLE TREATMENT CROPS**

**WINTER BEANS** – No yields due to very poor establishment and growth

**RYE (EXTRA)**

GRAIN (85% DRY MATTER) TONNES/HECTARE

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

FYMRES ROTATION	NONE	FYM	Mean
(ABe)R	1.94	2.51	2.22
(AO)R	3.05	3.53	3.29

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(LLn/AO)R	3.23	3.30	3.27
(LLc/ABe)R	2.72	0.97	1.84
Mean	2.73	2.58	2.66
Grain mean DM%	87.0		
Plot area harvested (ha)	0.00393		

**WINTER WHEAT**

Grain tonnes/hectare

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

FYMRES	none	FYM	Mean		
ROTATION					
(AO)W	3.68	2.50	3.09		
(ABe)W	2.94	1.75	2.34		
(LLn/AO)W	2.33	3.33	2.83		
(LLc/ABe)W	3.18	2.45	2.81		
(Ln)W	2.30	1.84	2.07		
(LLn/Ln)W	3.04	3.11	3.08		
(Lc)W	2.69	3.35	3.02		
(LLc/Lc)W	3.53	3.42	3.47		
Mean	2.96	2.72	2.84		
N	0	80	160	240	Mean
ROTATION					
(AO)W	2.76	3.26	2.91	3.44	3.09
(ABe)W	0.99	3.08	2.81	2.50	2.34
(LLn/AO)W	1.96	3.65	2.70	3.01	2.83
(LLc/ABe)W	1.10	3.44	3.73	2.99	2.81
(Ln)W	1.83	1.87	2.76	1.83	2.07
(LLn/Ln)W	2.40	3.87	4.09	1.95	3.08
(Lc)W	1.89	3.82	3.05	3.30	3.02
(LLc/Lc)W	1.87	3.72	4.26	4.05	3.47
Mean	1.85	3.34	3.29	2.88	2.84
N	0	80	160	240	Mean
FYMRES					
none	1.96	3.33	3.52	3.04	2.96
FYM	1.74	3.35	3.06	2.73	2.72

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Mean	1.85	3.34	3.29	2.88	2.84
N		0	80	160	240
ROTATION	FYMRES				
(AO)W	none	2.96	3.71	3.47	4.59
	FYM	2.56	2.81	2.35	2.28
(ABe)W	none	1.30	3.23	4.28	2.93
	FYM	0.67	2.93	1.35	2.06
(LLn/AO)W	none	2.48	2.94	2.00	1.90
	FYM	1.45	4.36	3.40	4.13
(LLc/ABe)W	none	0.95	3.45	4.32	3.99
	FYM	1.24	3.44	3.15	1.98
(Ln)W	none	2.13	1.99	3.05	2.03
	FYM	1.52	1.74	2.47	1.62
(LLn/Ln)W	none	2.04	3.80	4.35	1.99
	FYM	2.76	3.95	3.83	1.92
(Lc)W	none	1.82	3.74	2.24	2.95
	FYM	1.97	3.90	3.87	3.64
(LLc/Lc)W	none	2.00	3.76	4.47	3.90
	FYM	1.74	3.67	4.04	4.21
Mean		1.85	3.34	3.29	2.88

Grain mean DM% 87.10  
Plot area harvested (ha) 0.00183

**Note:** Wheat yield on plot 012 (ABe - FYM) were lower than expected, but the reason is not known.

**WINTER RYE**

Grain tonnes/hectare

*Tables of means*

FYMRES	none	FYM	Mean
ROTATION			
(AO)R	2.81	2.33	2.57
(ABe)R	1.79	2.52	2.15

Results of the Classics and other Long-term Experiments 2020

20/W/RN/3

(LLn/AO)R	3.85	3.94	3.90
(LLc/ABe)R	2.84	2.69	2.77
(Ln)R	3.74	3.13	3.43
(LLn/Ln)R	2.85	2.91	2.88
(Lc)R	3.04	3.72	3.38
(LLc/Lc)R	3.43	2.86	3.14
Mean	3.04	3.01	3.03

	N	0	50	100	150	Mean
ROTATION						
(AO)R		1.21	2.67	2.92	3.47	2.57
(ABe)R		1.17	2.22	2.85	2.36	2.15
(LLn/AO)R		2.43	4.73	4.15	4.27	3.90
(LLc/ABe)R		1.48	3.32	2.80	3.47	2.77
(Ln)R		3.02	3.81	4.21	2.69	3.43
(LLn/Ln)R		2.67	3.28	3.14	2.44	2.88
(Lc)R		2.93	4.47	3.26	2.86	3.38
(LLc/Lc)R		2.47	3.74	3.60	2.76	3.14
Mean		2.17	3.53	3.37	3.04	3.03

	N	0	50	100	150	Mean
FYMRES						
none		2.22	3.56	3.34	3.06	3.04
FYM		2.13	3.51	3.39	3.02	3.01
Mean		2.17	3.53	3.37	3.04	3.03

	N	0	50	100	150	
ROTATION						
(AO)R	FYMRES	none	1.54	2.95	3.15	3.60
		FYM	0.88	2.39	2.69	3.34
(ABe)R	none	1.18	1.66	2.39	1.91	
		FYM	1.15	2.79	3.32	2.81
(LLn/AO)R	none	2.74	4.67	3.95	4.03	
		FYM	2.12	4.80	4.35	4.50

Results of the Classics and other Long-term Experiments 2020

20/W/RN/3

(LLc/ABe)R	none	1.53	3.19	2.81	3.85
	FYM	1.43	3.46	2.79	3.09
(Ln)R	none	2.58	4.39	5.04	2.97
	FYM	3.46	3.24	3.39	2.41
(LLn/Ln)R	none	2.98	3.48	2.83	2.12
	FYM	2.36	3.07	3.45	2.75
(Lc)R	none	2.52	3.93	2.91	2.80
	FYM	3.34	5.01	3.62	2.91
(LLc/Lc)R	none	2.67	4.19	3.65	3.20
	FYM	2.27	3.29	3.55	2.32
	Mean	2.17	3.53	3.37	3.04
Grain mean DM%	87.20				
Plot area harvested (ha)	0.00183				

**Note:** The Rye yields on plots 49 (LLc/ABe -FYM) and 201 (AO - FYM) were lower than expected, but the reason is not known.

**WINTER OATS**

GRAIN (85% DRY MATTER) TONNES/HECTARE

*Tables of means*

FYMRES	NONE	FYM	Mean
ROTATION			
ABe	2.66	2.38	2.52
AO	1.87	1.93	1.90
LLc/ABe	3.23	3.12	3.18
LLn/AO	2.00	1.86	1.93
Mean	2.44	2.32	2.38
Grain mean DM%	85.2		
Plot area harvested (ha)	0.00393		