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# Yields of the Field Experiments 1965

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## 65/W/WLA/B/4 Ley and Arable Rotations

### Rothamsted Research

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65/B/4.1

LEY AND ARABLE ROTATIONS

(WIA)

Woburn Stackyard 1965 - the 28th year.

For history, treatments etc., see 'Details' 1962.

Sugar Beet: Fertilisers are now as follows:-

Test fertilisers: All combinations of:-

1. Nitrogen: Ley and lucerne rotations: 0.35, 0.70, 1.05, 1.40 cwt N.  
Arable with roots rotation: 0.70, 1.05, 1.40, 1.75 cwt N.  
Arable with hay rotation: 1.05, 1.40, 1.75, 2.10 cwt N.  
All N as 'Nitro-Chalk'.

2. Potash: 0.0, 0.9 cwt K<sub>2</sub>O as muriate of potash.

Basal fertilisers: 2.0 cwt P<sub>2</sub>O<sub>5</sub> as superphosphate, 0.9 cwt K<sub>2</sub>O as muriate of potash and magnesium sulphate at 500 lb MgSO<sub>4</sub> 7H<sub>2</sub>O.

Corrective K dressings (in cwt K<sub>2</sub>O) as muriate of potash:

Continuous rotations	No dung plots	Dung plots
Rotation		
Arable	3	2
Arable with hay	4	3
Lucerne	3	3
Grazed ley	0	0
Alternating rotations		
Last 2 rotations in order		
Arable/ley	3	1
Lucerne/arable with hay	3	3
Arable with hay/lucerne	3	3
Ley/arable	3	2

K equivalent of dung: In 1965 plots not receiving dung received 3.7 cwt K<sub>2</sub>O as muriate of potash, the K equivalent of the dung used.

The 1962 dressing was omitted from the 'Results' for that year and was 3.0 cwt K<sub>2</sub>O.

Sainfoin: The third-year lucerne failed and was replaced by sainfoin, which received a basal dressing of 0.5 cwt N as 'Nitro-Chalk', 0.5 cwt P<sub>2</sub>O<sub>5</sub> as superphosphate and 1.5 cwt K<sub>2</sub>O as muriate of potash. The second-year sainfoin failed and was resown with a basal fertiliser in the seedbed of 0.5 cwt P<sub>2</sub>O<sub>5</sub> and 0.5 cwt K<sub>2</sub>O as (0:20:20). The potatoes were lifted early because of damage by eelworm (*Heterodera rostochiensis*).

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Cultivations, etc.:

Treatment crops.

Ley 1st year: Ploughed: Aug 24, 1964. Seedbed fertilisers applied and seed sown: Apr 1, 1965. Compound fertiliser applied: June 16, Sept 9 - 21. Grazed 8 circuits: June 2 - Nov 7.

Ley 2nd year: Compound fertiliser applied: Mar 19, June 2, Sept 1. Grazed 10 circuits: Apr 22 - Nov 3.

Ley 3rd year: Compound fertiliser applied: Mar 19, June 22, Aug 23. Grazed 9 circuits: Apr 30 - Oct 26.

Sainfoin 1st year: Ploughed: Aug 24, 1964. Fertilisers applied: Apr 5, 1965. Seed drilled at 60 lb: Apr 7. Cut twice: Aug 11, Oct 20.

Sainfoin 2nd year: NK fertiliser applied: Mar 19, 1965. Cut twice: May 31, Aug 4. Sprayed with paraquat at 0.5 lb ion in 40 gals: Aug 12. Rotary cultivated: Aug 16. Basal PK applied: Aug 18. Re-drilled at 56 lb: Aug 19.

Sainfoin 3rd year: Ploughed: Nov 9, 1964. Fertilisers applied: Apr 5, 1965. Seed drilled at 60 lb: Apr 7. Cut twice: Aug 11, Oct 20.

Arable rotations.

Potatoes: Ploughed: Aug 24, 1964. Fertilisers applied, plots rotary cultivated: Apr 6, 1965. Potatoes machine planted: Apr 7.

Earthed up: June 14. Sprayed with mancozeb at 1.2 lb in 37 gals: July 5, July 16 and Aug 4. Sprayed with diquat (Reglone at 4 pints in 40 gals): Aug 12. Lifted: Aug 31.

Rye: Ploughed: Sept 29 - Oct 21, 1964. Seed combine drilled at 150 lb: Oct 22. 'Nitro-Chalk' applied: Mar 31, 1965. Combine harvested: Sept 14.

Seeds hay: Seeds undersown in rye at 30 lb: Apr 8, 1964. 'Nitro-Chalk' and PK compound applied: Mar 19, 1965. NK fertiliser applied: June 2. Cut twice: May 31, Aug 5.

Carrots: Ploughed: Sept 29, 1964. Fertilisers applied: Apr 8, 1965. Rotary cultivated, seed drilled at 3.5 lb: Apr 13. Sprayed with menazon (Saphicol at 0.5 pints in 40 gals): June 2, June 21. Lifted: Aug 27.

Test crops.

Sugar beet: Dung equivalent K and half corrective K (including all corrective K for plot 8 - arable/ley with dung applied: Nov 23, 1964. Dung applied: Nov 24. All plots ploughed: Nov 25. Part of basal superphosphate applied, basal muriate of potash and second half of corrective K applied: Feb 2, 1965. Remaining basal superphosphate applied, magnesium

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sulphate applied: Apr 1. Test 'Nitro-Chalk' and muriate of potash applied: Apr 2. Seed drilled at 5 lb: Apr 3. Singled: May 19. Lifted: Oct 26.

Barley: Ground chalk applied at 40 cwt: Nov 13, 1964. Ploughed: Nov 16. Balancing muriate of potash and basal superphosphate applied: Feb 16. 'Nitro-Chalk' applied: Feb 18. Seed drilled at 155 lb: Mar 12. Spring-tine cultivated and re-drilled at 140 lb because of bird damage: Apr 8. Sprayed with mecoprop/2,4-D (Methoxone Extra at 6 pints in 40 gals): May 11. Combine harvested: Sept 1.

Standard errors per plot.

Sugar beet 1/8 plot:

Roots:	2.146	or	10.6%	(21 d.f.)
Total sugar:	6.97	or	9.9%	(21 d.f.)
Tops:	2.081	or	12.1%	(21 d.f.)

Barley grain:

Whole plot:	1.71	or	4.1%	(4 d.f.)
1/2 plot:	0.80	or	1.9%	(4 d.f.)

Errata to 'Results' 1963 and 1964

p. 63/B/4.4	Lucerne 1st year	year dung applied	should read 1961 not 1958
p. 64/B/4.4	Sanfoin 1st year	year dung applied	should read 1962 not 1959
	Lucerne 2nd year	year dung applied	should read 1961 not 1958

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SUMMARY OF RESULTS

TREATMENT CROPS

LEY, SHEEP DAYS OF GRAZING

1st year	2nd year	3rd year
2168	3541	2915

SAINFOIN, DRY MATTER

	1st cut	2nd cut	Total
1ST YEAR			
Dung in 1963			
DO	24.6	7.4	32.0
DI	25.4	8.2	33.6
Lu	24.6	6.8	31.4
AH	25.4	8.6	34.0
Mean	25.0	7.7	32.7
2ND YEAR			
Dung in 1962			
DO	43.8	5.0	48.8
DI	43.0	4.2	47.2
Lu	42.4	4.2	46.6
AH	44.4	5.0	49.4
Mean	43.4	4.6	48.0

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SAINFOIN, DRY MATTER

	1st cut	2nd cut	Total
3RD YEAR (resown Spring 1965)			
Dung in 1961			
DO	26.7	4.3	31.0
DL	31.9	5.6	37.5
Lu	29.2	3.2	32.4
AH	29.4	6.8	36.2
Mean	29.3	5.0	34.3

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TREATMENT CROPS

	POTATOES		RYE	
	TOTAL TUBERS	% WARE	GRAIN	STRAW
DO	9.44	82.0	35.0	44.3
DI*	10.89	87.6	32.8	46.8
Ley	17.07	95.6	36.4	43.6
Lu	14.40	95.4	35.0	46.9
AH	4.05	69.6	29.8	48.7
AR	5.14	78.8	34.4	43.0
Mean	10.16	84.8	33.9	45.6

HAY

YIELD, DRY MATTER

	1st cut	2nd cut	Total
1961			
DO	57.6	39.0	96.6
DI	61.8	37.8	99.6
Ley	60.6	39.6	100.2
AH	58.8	37.2	96.0
Mean	59.7	38.4	98.1

\* Dung applied: Potatoes for test crop sugar beet in 1963  
Rye for test crop sugar beet in 1962

Mean D.M. %: Rye, grain: 68.4  
straw: 72.6

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	CARROTS	
	Roots	Tops
1961		
DO	30.96	13.31
DI	30.86	13.12
Lu	32.00	13.50
AR	29.82	12.93
Mean	30.91	13.22



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1ST TEST CROP

SUGAR BEET

ROOTS

	N1	N2	N3	N4	N5	N6
			(1)			
DO Ley	17.37	19.13	20.03	19.56	-	-
DO Lu	19.66	21.85	20.76	21.94	-	-
DO AH	-	-	17.10	18.52	19.50	19.61
DO AR	-	17.19	19.27	20.48	20.87	-
DI Ley	20.13	18.56	21.36	17.97	-	-
DI Lu	22.79	22.78	22.85	24.03	-	-
DI AH	-	-	19.11	21.11	20.97	20.36
DI AR	-	18.53	21.76	21.50	21.99	-
	Ley	Lu	AH	AR	Mean	
CCN	18.69	22.12	19.95	19.32	20.02	
AIT	19.84	22.05	19.13	21.08	20.52	
		(2)				
DO KO	18.35	21.69	18.22	19.12	19.35	
DO KI	19.69	20.42	19.15	19.79	19.76	
DI KO	19.92	22.05	20.00	21.77	20.93	
DI KI	19.09	24.18	20.78	20.11	21.04	
Mean	19.26	22.08	19.54	20.20	20.27	

(1) ( $\pm 1.073$ ) For use in horizontal and interaction comparisons

(2) ( $\pm 0.759$ ) For use in vertical and interaction comparisons

Symbols:

DO = No dung

DI = Dung

CCN = Continuous rotation

AIT = Alternating rotation

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1ST TEST CRCP

SUGAR BEET

SUGAR %

	N1	N2	N3	N4	N5	N6
Ley	17.4	17.5	17.1	17.2	-	-
DO Lu	17.8	18.2	17.5	17.7	-	-
AH	-	-	18.0	17.4	17.4	16.7
AR	-	17.8	18.0	17.5	17.2	-
Ley	17.4	17.0	17.1	16.6	-	-
DI Lu	17.4	17.7	17.4	16.7	-	-
AH	-	-	17.5	17.3	17.1	16.9
AR	-	17.7	17.4	17.2	17.1	-
	Ley	Lu	AH	AR	Mean	
CCN	17.3	17.5	17.3	17.3	17.3	
AIT	17.0	17.6	17.3	17.6	17.4	
DO KD	17.5	17.7	17.7	17.7	17.6	
DO K1	17.2	17.9	17.0	17.6	17.4	
DI KO	16.8	17.4	17.1	17.5	17.2	
DI K1	17.2	17.2	17.2	17.2	17.2	
Mean	17.1	17.5	17.3	17.5	17.4	

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1ST TEST CROP

SUGAR BEET

TOTAL SUGAR

	N1	N2	N3	N4	N5	N6
			(1)			
DO Ley	60.4	66.8	68.5	67.4	-	-
DO Lu	69.8	79.4	72.6	77.7	-	-
DO AH	-	-	61.7	64.2	67.8	65.3
DO AR	-	61.2	69.5	71.6	71.7	-
D1 Ley	69.8	62.8	72.8	59.3	-	-
D1 Lu	78.9	80.4	79.8	80.4	-	-
D1 AH	-	-	66.7	72.9	71.9	68.7
D1 AR	-	65.5	75.4	74.1	75.5	-
	Ley	Lu	AH	AR	Mean	
CCN	64.6	77.1	68.9	66.9	69.4	
AIF	67.4	77.6	66.0	74.2	71.3	
		(2)				
DO KO	64.1	76.6	64.4	67.6	68.2	
DO K1	67.5	73.1	65.1	69.5	68.8	
D1 KO	66.9	76.7	68.5	76.0	72.0	
D1 K1	65.4	83.1	71.7	69.2	72.4	
Mean	66.0	77.4	67.4	70.6	70.3	

(1) ( $\pm 3.48$ ) For use in horizontal and interaction comparisons

(2) ( $\pm 2.46$ ) For use in vertical and interaction comparisons

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LST TEST CROP

SUGAR BEET

TOFS

		N1	N2	N3	N4	N5	N6	
		(1)						
D0	Ley	16.68	18.33	20.68	20.16	-	-	
	Lu	13.21	15.14	16.44	17.86	-	-	
	AH	-	-	14.92	15.31	17.82	20.09	
	AR	-	10.61	12.67	13.79	17.37	-	
D1	Ley	18.65	17.56	22.36	19.92	-	-	
	Lu	18.89	19.92	19.18	19.89	-	-	
	AH	-	-	15.80	19.04	20.36	21.55	
	AR	-	11.14	15.01	15.47	16.61	-	
		Ley	Lu	AH	AR	Mean		
CON		18.09	17.93	18.90	13.04	16.99		
AIT		20.49	17.20	17.32	15.13	17.54		
		(2)						
D0	K0	18.27	16.53	16.41	13.43	16.16		
D0	K1	19.66	14.79	17.65	13.78	16.47		
D1	K0	20.23	19.11	19.65	15.02	18.50		
D1	K1	19.01	19.83	18.73	14.10	17.92		
Mean		19.29	17.57	18.11	14.08	17.26		

(1) ( $\pm 1.040$ ) For use in horizontal and interaction comparisons

(2) ( $\pm 0.736$ ) For use in vertical and interaction comparisons

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2ND TEST CROP

BARLEY

1964	Ley	Lu	AH	AR	Mean
GRAIN					
(1) and (2)					
D0	38.5	42.4	41.4	41.1	40.9
D1	36.6	44.9	42.8	43.2	41.9
Mean ( $\pm 1.21$ )	37.5	43.7	42.1	42.2	41.4
STRAW					
D0	52.8	33.2	32.4	34.2	38.2
D1	48.9	37.0	29.6	40.9	39.1
Mean	50.9	35.1	31.0	37.6	38.6

Mean D.M. %: Grain: 75.2  
 Straw: 76.6

(1) ( $\pm 1.27$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 0.56$ ) For use in vertical and interaction comparisons