

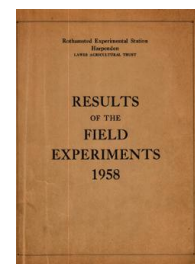
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Yields of the Field Experiments 1958

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58/W/BE/1 Ley and Arable Rotations

Rothamsted Research

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LEY AND ARABLE ROTATIONS

Woburn Stackyard 1958 - the 21st year.

For history, treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

In 1958, owing to the use of a new compound fertilizer (16% N, 16% K) the following alterations were made in fertilizer treatments:-

	<u>Old treatment</u>		<u>New treatment</u>	
	N	K	N	K
Carrots	0.48	0.6 in seedbed	0.6	0.6 in seedbed
1 year hay	0.48	0.6 in spring	0.6	0.6 in spring
	0.22	- for aftermath	0.22	- for aftermath
2nd & 3rd year	0.2	0.55 in spring	0.18	0.18 in spring
of grazed ley	0.2	- in early summer	0.18	0.18 in early summer
	0.2	- in late summer	0.18	0.18 in late summer

Under the revised scheme the total P & K balance for all four rotations as before, and at the same level.

Owing to acidity the following extra dressings of ground chalk were applied during the year 1957/8:-

To Block 2 (plots 17-32): 12 cwt per acre.

To Block 3 (plots 33-47): 19 cwt per acre.

The chalk was applied in winter 1957/8 except to potatoes, where it was applied shortly after lifting in 1958.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 30, 1957 and Nov 30.

Ground chalk applied at 19 cwt per acre: Mar 5, 1958. Basal fertilizers and 'Nitro-Chalk' applied: Apr 18. Seed sown at 40 lb per acre: Apr 19. 'Nitro-Chalk' applied: 2nd dressing - June 30; 3rd dressing - Aug 13. Grazed 7 circuits: June 23 - Nov 3. Seeds mixture: 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Potash and nitrogen fertilizer applied: Mar 24, May 29, Aug 8. Grazed 9 circuits: Apr 28 - Oct 24.

Ley 3rd year. Ground chalk applied at 12 cwt per acre: Mar 5. Potash and nitrogen fertilizer applied: Mar 24, May 30, Aug 8. Grazed 8 circuits: May 6 - Nov 5.

Lucerne 1st year. Ploughed twice: Aug 30, 1957 and Nov 30.

Ground chalk applied at 19 cwt per acre: Mar 5, 1958. Basal fertilizers applied: Apr 18. Seed sown at 25 lb per acre: Apr 19. Sprayed with dieldrin at 2 pints in 40 gallons per acre: June 14. Cut twice: Aug 8, Oct 14. Variety: Du Puits.

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Lucerne 2nd year. Basal potash applied: Mar 14. Cut 3 times:
June 16, Aug 8, Oct 14.

*Lucerne 3rd year. Basal potash applied: Mar 14. Cut 3 times:
June 16, Aug 8, Oct 14.

Arable rotations

Potatoes 1st course. Ploughed twice: Aug 30, 1957 and Nov 30.
Basal fertilizers applied: Apr 16, 1958. Potatoes machine
planted: Apr 17. Earthed up: June 19. Sprayed 3 times with
copper fungicide: 5 lb in 80 gallons per acre, July 14; 5 lb
in 40 gallons per acre, July 29 and Aug 16. Sprayed with
arsenious compound, 1 gallon in 40 gallons per acre: Sept 12.
Lifted: Oct 7. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 5, 1957. Seed drilled at $2\frac{1}{2}$
bushels per acre: Oct 26. 'Nitro-Chalk' applied: Apr 22, 1958.
Seeds hay mixture undersown on 4 plots: Apr 19. Harvested:
Aug 31. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye:
May 11, 1957. Ploughed: Aug 26. Resown: Aug 28. Ground
chalk applied at 12 cwt per acre: Mar 5, 1958. Potash and
nitrogen fertilizer applied: Mar 24. 1st cut: June 16.
'Nitro-Chalk' applied: June 17. 2nd cut: Oct 14. Seeds
mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering
Red Clover, 2 lb Alsike American.

Carrots 3rd course. Ploughed twice: Aug 26, 1957 and Nov 29.
Ground chalk at 12 cwt per acre applied: Mar 5, 1958. Potash
and nitrogen fertilizer applied: Apr 18. Carrots sown: Apr 19.
Sprayed with dieldrin at 2 pints in 40 gallons per acre:
June 14, and at 4 pints in 40 gallons per acre: Aug 11.
Singled: June 9-18. Lifted: Oct 27. Variety: Scarlet
Intermediate.

Test crops

Sugar beet 1st test crop. Dung applied, ploughed: Nov 29, 1957.
Basal and treatment fertilizers applied: Apr 17, 1958. Seed
drilled at 12 lb per acre: Apr 18. Sprayed with miscible
DDT at 3 pints in 40 gallons per acre: May 3. Singled:
June 5. Sprayed with demeton methyl at 11 oz in 32 gallons
per acre: June 26. Lifted: Oct 27. Variety: Klein E.

Barley 2nd test crop. Ploughed: Dec 6, 1957. Potash applied
to equalize treatment dressings to 1957 sugar beet test crop:
Feb 3, 1958. Ground chalk applied at 21 cwt per acre: Mar 5.
'Nitro-Chalk' applied: Mar 20. Seed drilled at $2\frac{1}{2}$ bushels
per acre: Mar 20. Harvested: Aug 27. Variety: Herta.

*Note: Plots 27 and 28 were fallowed and received no potash.

58/Be/1.3

Standard errors per plot. Test crops.

	Sugar beet. Total sugar.	Whole plot:	1.35 cwt per acre	or 2.4%	(4 d.f.)
		$\frac{1}{2}$ plot:	2.32 cwt per acre	or 4.1%	(4 d.f.)
		$\frac{1}{8}$ plot:	4.91 cwt per acre	or 8.6%	(24 d.f.)
	Tops	Whole plot:	1.57 tons per acre	or 7.6%	(4 d.f.)
		$\frac{1}{2}$ plot:	1.23 tons per acre	or 6.0%	(4 d.f.)
		$\frac{1}{8}$ plot:	1.90 tons per acre	or 9.2%	(24 d.f.)
Barley.	Grain(at 85% Dry Matter)	Whole plot:	1.44 cwt per acre	or 5.1%	(4 d.f.)
		$\frac{1}{2}$ plot:	1.09 cwt per acre	or 3.9%	(4 d.f.)

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
1662	2361	2349

Lucerne, yield of hay (at 85% dry matter): cwt per acre

	1st cut	2nd cut	3rd cut	Total
<u>1st year</u>				
Dung in 1956: tons per acre				
None	17.2	12.9		30.1
15	23.6	16.0		39.6
Difference	6.4	3.1		9.5
Previous rotation				
Lucerne	13.5	13.5		27.0
Arable with hay	27.2	15.4		42.6
Mean	20.4	14.4		34.8
<u>2nd year</u>				
Dung in 1955: tons per acre				
None	5.2	10.4	6.8	22.4
15	14.1	18.4	11.1	43.6
Difference	8.9	8.0	4.3	21.2
Previous rotation				
Lucerne	9.6	14.6	9.3	33.5
Arable with sugar beet	9.7	14.2	8.6	32.5
Mean	9.6	14.4	8.9	32.9
<u>3rd year</u>				
Dung in 1954: tons per acre				
None	17.5	23.2	8.4	49.1
15	24.2	27.8	9.1	61.1
Difference	6.7	4.6	0.7	12.0

58/Be/1.5

	Treatment crops		Rye	
	Potatoes	Percentage	Grain:	Straw:
Dung: tons per acre	Total tubers:	ware	(at 85% D.M.)	cwt per acre
	tons per acre	(1 $\frac{5}{8}$ " riddle)		
None	12.97	90.5	28.9	42.4
15 [#]	15.00	91.0	28.8	42.8
Difference	+2.03	+0.5	-0.1	+0.4
Previous rotation				
Ley	16.04	94.2	29.8	45.0
Lucerne	14.95	89.8	29.8	45.6
Arable with hay	11.58	87.6	28.6	41.8
Arable with sugar beet	13.37	91.5	27.2	38.0
Mean	13.99	90.8	28.8	42.6

Hay

Yield (at 85% dry matter): cwt per acre

	1st cut	2nd cut	Total
Dung in 1954: tons per acre			
None	58.6	15.6	74.2
15	66.8	24.6	91.4
Difference	8.2	9.0	17.2
Previous rotation			
Lucerne	67.1	27.0	94.1
Arable with hay	58.2	13.3	71.5
Mean	62.7	20.1	82.8

Carrots

	Roots Washed:	Tops:
Dung in 1954: tons per acre	tons per acre	tons per acre
None	6.22	0.88
15	8.32	1.10
Difference	2.10	0.22
Previous rotation		
Ley	7.56	1.00
Arable with sugar beet	6.98	0.98
Mean	7.27	0.99

[#] Dung applied: Potatoes - for test crop sugar beet in 1956.
Rye - for test crop potatoes in 1955.

58/Be/1.6

	1st Test crop Sugar beet Previous rotation				Mean
	Ley	Lucerne	Arable with hay	Arable with roots	
Roots (washed): tons per acre					
Mean	17.90	17.17	15.46	16.47	16.75
Dung: tons per acre					
None	16.92	15.76	13.60	14.14	15.10
15	18.87	18.58	17.32	18.80	18.39
Difference	1.95	2.82	3.72	4.66	3.29
Response to additional 0.72 cwt N per acre					
No dung	-0.44	-0.49	-0.54	+0.90	-0.14
Dung 15 tons per acre	+1.96	-0.99	-0.63	-0.08	+0.06
Response to additional 0.9 cwt K ₂ O per acre					
No dung	+2.97	+0.35	+1.39	+0.24	+1.24
Dung 15 tons per acre	+0.44	-0.44	+0.52	-1.32	-0.20
Sugar Percentage					
Mean	16.5	16.8	17.5	17.5	17.1
Dung: tons per acre					
None	16.5	17.0	17.7	17.5	17.2
15	16.5	16.5	17.2	17.5	16.9
Difference	0.0	-0.5	-0.5	0.0	-0.3
Response to additional 0.72 cwt N per acre					
No dung	-1.4	-0.7	-0.9	-0.5	-0.9
Dung 15 tons per acre	-0.3	-0.3	-0.1	-0.5	-0.3
Response to additional 0.9 cwt K ₂ O per acre					
No dung	+0.4	-0.3	+0.3	+0.2	+0.1
Dung 15 tons per acre	-0.1	+0.5	0.0	+0.1	+0.1

58/Be/1.7

		1st Test crop Sugar beet				
		Previous rotation				
		Ley	Lucerne	Arable with hay	Arable with roots	Mean
Total sugar: cwt per acre						
Mean	(±0.96)	59.1	57.6	54.0	57.7	57.1
Dung: tons per acre						
None	(±1.50)*	56.0	53.8	48.3	49.6	51.9
15		62.2	61.4	59.6	65.7	62.2
Difference	(±2.32)	6.2	7.6	11.3	16.1	10.3
						(±1.16)
Response to additional 0.72 cwt N per acre		(±3.47)				(±1.74)
No dung		-6.1	-3.7	-4.3	+1.7	-3.1
Dung 15 tons per acre		+5.2	-4.2	-2.3	-2.2	-0.9
Response to additional 0.9 cwt K ₂ O per acre		(±3.47)				(±1.74)
No dung		+11.1	+0.4	+5.4	+1.4	+4.6
Dung 15 tons per acre		+0.9	+0.3	+1.9	-4.2	-0.3
Tops: tons per acre						
Mean	(±1.113)	23.74	22.27	18.30	18.31	20.66
Dung: tons per acre						
None	(±1.273)*	22.72	21.13	16.58	17.15	19.39
15		24.77	23.41	20.03	19.48	21.92
Difference	(±1.235)	2.05	2.28	3.45	2.33	2.53
						(±0.617)
Response to additional 0.72 cwt N per acre		(±1.346)				(±0.673)
No dung		+3.70	+2.90	+2.76	+4.73	+3.52
Dung 15 tons per acre		+3.86	+1.90	+2.83	+4.72	+3.32
Response to additional 0.9 cwt K ₂ O per acre		(±1.346)				(±0.673)
No dung		+2.94	+2.05	-0.79	-2.46	+0.44
Dung 15 tons per acre		+1.95	+0.22	-1.74	+0.50	+0.23

* For use in horizontal and diagonal comparisons only.

58/Be/1.8

1st Test Crop
Sugar beet

Plots receiving no additional N or K

Dung: tons per acre	Ley	Previous rotation			Mean	
		Lucerne	Arable with hay	Arable with roots		
Roots (washed): tons per acre						
Mean	16.76	17.30	15.83	16.19	16.52	
None	15.78	15.36	14.26	13.16	14.64	
15	17.75	19.24	17.39	19.22	18.40	
Difference	+1.97	+3.88	+3.13	+6.06	+3.76	
Sugar percentage						
Mean	16.8	17.0	17.8	17.6	17.3	
None	16.9	17.6	18.1	17.6	17.5	
15	16.6	16.6	17.4	17.6	17.0	
Difference	-0.3	-1.0	-0.7	0.0	-0.5	
Total sugar: cwt per acre						
Mean	(±2.38)	56.1	58.8	56.1	57.0	57.0
None	(±3.36)*	53.4	54.0	51.6	46.4	51.3
15		58.8	63.6	60.5	67.7	62.7
Difference	(±4.85)	+5.4	+9.6	+8.9	+21.3	+11.4
Tops: tons per acre						
Mean	(±1.221)	20.46	21.09	17.67	17.49	19.18
None	(±1.726)*	19.38	19.43	16.07	17.32	18.05
15		21.55	22.75	19.27	17.66	20.31
Difference	(±2.060)	+2.17	+3.32	+3.20	+0.34	+2.26

*For use in horizontal and diagonal comparisons only.

58/Be/1.9

Dung in 1957: tons per acre		2nd Test crop Barley				Mean
		Previous rotation				
		Ley	Lucerne	Arable with hay	Arable with roots	
Grain (at 85% Dry Matter): cwt per acre						
None	$(\pm 1.15)^{\#}$	28.1	30.2	27.0	28.6	28.5
15		25.8	28.8	27.4	29.7	27.9
Mean	(± 1.02)	26.9	29.5	27.2	29.1	28.1
Difference	(± 1.09)	-2.3	-1.4	+0.4	+1.1	-0.6 (± 0.54)
Straw (at 85% Dry Matter): cwt per acre						
None		30.4	28.1	25.9	25.9	27.5
15		30.6	31.6	31.4	32.3	31.4
Mean		30.5	29.8	28.6	29.1	29.4
Difference		+0.2	+3.5	+5.5	+6.4	+3.9

*For use in horizontal and diagonal comparisons only.

Note: There was early lodging on the plots receiving dung in 1957.