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Yields of the Field Experiments 1957

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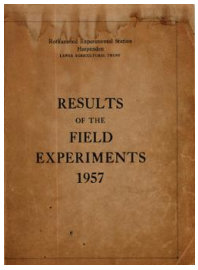

57/W/BE/1 Ley and Arable Rotations

Rothamsted Research

Rothamsted Research (1958) *57/W/BE/1 Ley and Arable Rotations ;* Yields Of The Field Experiments 1957, pp 52 - 59 **- DOI: https://doi.org/10.23637/ERADOC-1-177**

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LEY AND ARABLE ROTATIONS

Woburn Stackyard 1957 - the 20th year.

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

In 1957 the divided application of 'Nitro-Chalk' to 1st, 2nd and 3rd year grazed ley was changed to three equal dressings of 0.2 cwt N per acre instead of two at 0.3 cwt N per acre.

Turnips were substituted for the carrot crop which failed.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 24, 1956 and Oct 1. Basal fertilizers applied: Apr 8, 1957. Seed sown at 40 lb per acre: Apr 15. 'Nitro-Chalk' applied: 2nd dressing - July 26; 3rd dressing - Aug 30. Grazed 5 circuits: June 23 - Oct 24. 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. Basal potash applied: Mar 11. 'Nitro-Chalk' applied: Mar 11, June 1 and Sept 3. Grazed 8 circuits: Apr 5 - Oct 16.

Ley 3rd year. Basal potash applied: Mar 11. 'Nitro-Chalk' applied: Mar 11, June 7 and Aug 30. Grazed 8 circuits: Apr 17 - Oct 8.

Lucerne 1st year. Ploughed: Oct 1, 1956. Basal fertilizers applied: Apr 8, 1957. Seed sown at 25 lb per acre: Apr 15. Sprayed with dieldrin at 2½ pints in 20 gallons per acre: June 13. Cut twice: July 17 and Sept 15. Variety: Du Puits.

Lucerne 2nd year. Basal potash applied: Mar 11. Cut 3 times: June 11, July 17 and Sept 17.

Lucerne 3rd year. Basal potash applied: Mar 11. Cut 3 times: June 11, July 17 and Sept 17.

Arable rotations

Potatoes 1st course. Ploughed twice: Aug 24, 1956 and Oct 1. Basal fertilizers applied: Apr 5, 1957. Potatoes machine planted: Apr 9. Earthed up: July 3. Sprayed 3 times with copper fungicide, 5 lb in 40 gallons per acre: Aug 3, Aug 23 and Sept 4. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 16. Lifted: Oct 1. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 9, 1956. Seed drilled at 2½ bushels per acre: Oct 20. 'Nitro-Chalk' applied: Apr 18, 1957. Seeds hay mixture undersown on 4 plots: May 11 and resown Aug 28. Harvested: Aug 7. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: Apr 20, 1956. Sulphate of ammonia and potash applied: Mar 14, 1957. 1st cut: June 11. 'Nitro-Chalk' applied: June 13. 2nd cut: Sept 2. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American.

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Turnips (after carrots failed) 3rd course. Ploughed twice: Sept 29, 1956 and Nov 17. Sulphate of ammonia and potash applied: Apr 11, 1957. Carrots sown: May 11. Turnips drilled at 5 lb per acre: July 5. Singled: July 29 - Aug 7. Harvested: Sept 26 - 30. Variety: Imperial Green Globe.

Test crops

Sugar beet 1st test crop. Dung applied: Dec 13, 1956. Ploughed: Dec 14. Basal and treatment fertilizers applied: Apr 8, 1957. Seed drilled at 12 lb per acre: Apr 12. Sprayed with miscible DDT at 3 pints in 20 gallons per acre: May 22. Singled: June 13 - 17. Sprayed with methyl demeton at 12 oz in 60 gallons per acre: July 8. Lifted: Nov 14 - 18. Variety: Klein E.

Barley 2nd test crop. Ploughed: Dec 5, 1956. Potash applied to equalize treatment dressings to 1956 sugar beet test crop: Dec 19. Ground chalk applied at 20 cwt per acre: Feb 27, 1957. 'Nitro-Chalk' applied: Mar 5. Seed drilled at 2½ bushels per acre: Mar 16. Harvested: Aug 2. Variety: Herta.

Standard errors per plot. Test crops.

Sugar beet.	Total sugar.	Whole plot:	4.88 cwt per acre or 10.0% (4 d.f.)
		½ plot:	5.53 cwt per acre or 11.4% (4 d.f.)
		⅛ plot:	2.99 cwt per acre or 6.1% (24 d.f.)
	Tops.	Whole plot:	1.965 tons per acre or 7.4% (4 d.f.)
		½ plot:	1.042 tons per acre or 7.8% (4 d.f.)
		⅛ plot:	0.940 tons per acre or 7.1% (24 d.f.)
Barley.	Grain.	Whole plot:	1.40 cwt per acre or 4.3% (4 d.f.)
		½ plot:	2.42 cwt per acre or 7.4% (4 d.f.)

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Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
976	1994	1891

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

	1st crop	2nd crop	3rd crop	Total
1st year				
Dung in 1955: tons per acre				
None	0.5	9.9		10.4
15	2.5	18.6		21.1
Difference	+2.0	+8.7		+10.7
Previous rotation				
Lucerne	2.2	15.1		17.3
Arable with sugar beet	0.8	13.4		14.2
Mean	1.5	14.2		15.7
2nd year				
Dung in 1954: tons per acre				
None	16.6	15.9	17.2	49.7
15	24.0	17.7	19.3	61.0
Difference	+7.4	+1.8	+2.1	+11.3
Previous rotation				
Lucerne	22.0	17.0	19.5	58.5
Arable with hay	18.6	16.6	17.1	52.3
Mean	20.3	16.8	18.3	55.4
3rd year				
Dung in 1953: tons per acre				
None	33.4	21.8	21.7	76.9
15	40.0	22.8	24.9	87.7
Difference	+6.6	+1.0	+3.2	+10.8
Previous rotation				
Lucerne	34.6	22.9	22.4	79.9
Arable with sugar beet	38.8	21.8	24.2	84.8
Mean	36.7	22.3	23.3	82.3

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware	Grain: cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	13.21	91.3	33.2	38.7
15*	13.64	91.2	31.9	37.7
Difference	+0.43	-0.1	-1.3	-1.0
Previous rotation				
Ley	15.76	89.0	34.4	41.5
Lucerne	11.97	91.0	34.4	40.5
Arable with hay	13.78	92.8	27.9	31.6
Arable with sugar beet	12.19	92.3	33.4	39.2
Mean	13.43	91.2	32.5	38.2

Hay

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

	1st crop	2nd crop	Total
Dung in 1953: tons per acre			
None	54.0	25.7	79.7
15	56.7	26.2	82.9
Difference	+2.7	+0.5	+3.2
Previous rotation			
Ley	52.9	25.1	78.0
Arable with hay	57.8	26.8	84.6
Mean	55.4	26.0	81.4

Turnips

	Roots: tons per acre	Tops: tons per acre
Dung in 1953: tons per acre		
None	11.95	8.84
15	13.25	10.19
Difference	1.30	1.35
Previous rotation		
Lucerne	12.97	10.34
Arable with sugar beet	12.23	8.68
Mean	12.60	9.51

*Dung applied: Potatoes - for test crop potatoes in 1955.
Rye - for test crop potatoes in 1954.

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1st Test crop
Sugar beet

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Roots (washed): tons per acre					
Mean	16.42	14.54	12.86	13.81	14.41
Dung: tons per acre					
None	15.41	13.66	11.93	12.76	13.44
15	17.44	15.41	13.80	14.87	15.38
Difference	+2.03	+1.75	+1.87	+2.11	+1.94
Response to additional 0.72 cwt N per acre					
No dung	-0.08	-0.03	-0.11	+0.86	+0.16
Dung 15 tons per acre	+1.14	+1.06	+1.13	+0.18	+0.88
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.39	-0.21	-0.21	+0.76	+0.18
Dung 15 tons per acre	+0.04	+1.49	+0.18	-0.08	+0.40
Sugar percentage					
Mean	16.6	16.7	17.1	17.4	16.9
Dung: tons per acre					
None	16.7	16.8	17.2	17.4	17.0
15	16.5	16.6	17.0	17.3	16.8
Difference	-0.2	-0.2	-0.2	-0.1	-0.2
Response to additional 0.72 cwt N per acre					
No dung	-0.7	-0.4	-0.5	-0.3	-0.5
Dung 15 tons per acre	-1.1	-0.6	-1.0	-0.6	-0.8
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.3	+0.1	+0.4	+0.1	+0.3
Dung 15 tons per acre	+0.2	+0.3	0.0	-0.6	0.0

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1st Test crop

Sugar beet

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Total sugar: cwt per acre					
Mean (±3.45)	54.4	48.4	44.0	48.0	48.7
Dung: tons per acre					
None (±2.80)	51.4	45.8	41.1	44.5	45.7
15	57.4	51.0	46.8	51.4	51.7
Difference (±5.53)	+6.0	+5.2	+5.7	+6.9	+6.0 (±2.76)
Response to additional 0.72 cwt N per acre	(±2.11)				(±1.06)
No dung	-2.3	-1.2	-1.5	+2.4	-0.6
Dung 15 tons per acre	-0.1	+1.8	+1.3	-1.1	+0.5
Response to additional 0.9 cwt K_2O per acre	(±2.11)				(±1.06)
No dung	+2.4	-0.4	+0.3	+2.8	+1.3
Dung 15 tons per acre	+0.8	+5.6	+0.6	-2.0	+1.2
Tops: tons per acre					
Mean (±0.695)	14.62	13.42	13.61	11.54	13.30
Dung: tons per acre					
None (±0.556)	14.61	13.46	13.45	10.68	13.05
15	14.63	13.37	13.76	12.41	13.54
Difference (±1.042)	+0.02	-0.09	+0.31	+1.73	+0.49 (±0.521)
Response to additional 0.72 cwt N per acre	(±0.665)				(±0.332)
No dung	+1.83	+2.40	+2.78	+3.73	+2.69
Dung 15 tons per acre	+2.48	+2.26	+3.57	+3.81	+3.03
Response to additional 0.9 cwt K_2O per acre	(±0.665)				(±0.332)
No dung	-0.02	-1.27	-0.81	-0.46	-0.64
Dung 15 tons per acre	+0.58	-1.37	-0.47	+0.02	+0.05

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1st Test crop
Sugar beet

Plots receiving no additional N or K

Dung: tons per acre		Previous rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Roots (washed): tons per acre						
Mean		16.26	13.94	12.89	13.43	14.13
None		15.50	13.91	12.55	12.10	13.52
15		17.02	13.98	13.23	14.76	14.75
Difference		+1.52	+0.07	+0.68	+2.66	+1.23
Sugar percentage						
Mean		17.0	16.8	17.5	17.8	17.3
None		16.8	17.0	17.3	17.6	17.2
15		17.2	16.6	17.6	18.0	17.4
Difference		+0.4	-0.4	+0.3	+0.4	+0.2
Total sugar: cwt per acre						
Mean	(±2.37)	55.2	46.9	45.0	47.8	48.7
None	(±3.35)*	52.0	47.2	43.4	42.6	46.3
15		58.4	46.6	46.6	52.9	51.1
Difference	(±3.79)	+6.4	-0.6	+3.2	+10.3	+4.8
Tops: tons per acre						
Mean	(±0.566)	13.61	12.16	12.52	9.54	11.96
None	(±0.800)*	14.04	12.70	12.46	8.83	12.01
15		13.19	11.62	12.58	10.24	11.91
Difference	(±0.967)	-0.85	-1.08	+0.12	+1.41	-0.10

*For use in comparisons other than vertical.

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2nd Test crop

Barley

Dung in 1956: tons per acre		Previous rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
		Grain: cwt per acre				
None	(±1.56)*	32.1	31.2	29.8	27.3	30.1
15		35.5	35.5	36.2	33.3	35.1
Mean	(±0.98)	33.8	33.3	33.0	30.3	32.5
Difference	(±2.42)	+3.4	+4.3	+6.4	+6.0	+5.0 (±1.21)
		Straw: cwt per acre				
None		28.0	25.4	22.8	24.4	25.1
15		33.1	32.6	31.6	31.6	32.2
Mean		30.5	29.0	27.2	28.0	28.6
Difference		+5.1	+7.2	+8.8	+7.2	+7.1

*For use in comparisons other than vertical.

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