ROTHAMSTED RESEARCH

Yields of the Field Experiments 1961

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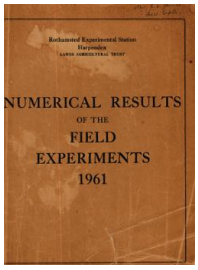

61/W/B/4 Ley and Arable Rotations

Rothamsted Research

Rothamsted Research (1962) *61/W/B/4 Ley and Arable Rotations ;* Yields Of The Field Experiments 1961, pp 53 - 61 **- DOI: https://doi.org/10.23637/ERADOC-1-182**

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1961 - the 24th year.

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

Liming: The routine dressing (before barley) is now increased to 2 tons $CaCO_3$ per acre.

Potato lifting: Owing to the introduction of the 2-row elevator digger yields are now estimated from 6 rows per plot instead of 8.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. PK fertilisers and 'Nitro-Chalk' applied, seed sown at 40 lb per acre: Apr 10. 2nd dressing of 'Nitro-Chalk' applied, sprayed with MCPB at 4 pints in 40 gallons per acre: June 19. 3rd dressing of 'Nitro-Chalk' applied: Aug 11. Grazed 4 circuits: July 18 - Oct 17. Seeds mixture: 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover per acre.

Ley 2nd year. Potash and nitrogen fertiliser applied: Mar 15, June 19, July 27, 1961. Grazed 7 circuits: Apr 17 - Oct 9.

Ley 3rd year. Potash and nitrogen fertiliser applied: Mar 15, June 19, July 27, 1961. Grazed 7 circuits: Apr 21 - Oct 1.

Lucerne 1st year. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. Treated for control of stem eelworm:- Plots 25, 26, 29, 30 fumigated with undiluted metham sodium ("Vapam") at 2 pints to 50 sq. ft: Mar 15. Ploughed: Apr 19. PK fertilisers applied: May 8. Seed drilled at 20 lb per acre: May 9. Sprayed (against weevil) with DDT emulsion (25% DDT) at 2 pints in 40 gallons per acre: May 20. Sprayed with dieldrin (as a bird deterrent) at $2\frac{1}{2}$ pints in 40 gallons per acre: June 12. Cut once: Sept 18. Variety: Du Puits.

Lucerne 2nd year. Muriate of potash applied: Mar 15, 1961. Cut 3 times: June 14, July 24, Sept 18.

Lucerne 3rd year. Treated for control of stem eelworm:- Plots 69, 70, 79, 80 treated with 5% granular 'E18133' at 8 lb active material per acre: Oct 20, 1960. Muriate of potash applied: Mar 15, 1961. Cut 3 times: June 14, July 24, Sept 18.

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Arable rotations

Potatoes 1st course. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. Compound fertiliser applied, potatoes machine planted: Mar 20. Earthed up: June 16. Haulm destroyed mechanically: Sept 19. Lifted: Sept 21. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 14, 1960. Seed drilled at 3 bushels per acre: Jan 18, 1961. Seeds hay mixture undersown on 4 plots: Apr 11. 'Nitro-Chalk' applied: Apr 12. Combine harvested: Aug 28. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: Apr 7, 1960. Potash and nitrogen fertiliser applied: Mar 15, 1961. 'Nitro-Chalk' applied: May 29. Cut twice: May 29 and Aug 14. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American per acre.

Carrots 3rd course. Ploughed twice: Aug 25, 1960 and Jan 7, 1961. Potash and nitrogen fertilisers applied: Apr 12. Seed drilled at 5 lb per acre: Apr 14. Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre: May 29 and June 12. Thinned: July 3 - 10. Lifted: Sept 14. Variety: Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Treated for control of lucerne stem eelworm:- Plots 37 and 38 split for fumigation with undiluted metham sodium ("Vapam") at 1 pint to 50 sq. ft: Nov 24, 1960. Ground chalk applied at 16 cwt per acre: Jan 5, 1961. Dung applied: Jan 16. Ploughed: Jan 19. Treatment fertilisers and basal compound fertilisers applied: Mar 27. Seed drilled at 10 lb per acre: Apr 10. Sprayed (against flea beetle) with DDT emulsion (25% DDT) at 3 pints in 40 gallons per acre: May 20. Singled: May 30. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 20, July 10. Lifted: Oct 9. Variety: Klein E.

Barley 2nd test crop. Ground chalk applied at 40 cwt per acre: Jan 5, 1961. Ploughed: Jan 7. 'Nitro-Chalk' applied, muriate of potash applied to equalise treatment dressings to 1960 sugar beet test crop: Mar 13. Seed drilled at $2\frac{1}{2}$ bushels per acre: Mar 15. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 12. Variety: Herta.

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Standard errors per plot. Test crops.

Sugar beet.	Roots (washed).	Whole plot:	1.511 tons per acre or 9.3% (4 d.f.)
		½ plot:	1.376 tons per acre or 8.4% (4 d.f.)
		⅛ plot:	1.470 tons per acre or 9.0% (24 d.f.)
	Total sugar.	Whole plot:	4.26 cwt per acre or 7.9% (4 d.f.)
		½ plot:	4.34 cwt per acre or 8.1% (4 d.f.)
		⅛ plot:	4.87 cwt per acre or 9.1% (24 d.f.)
	Tops.	Whole plot:	1.418 tons per acre or 10.9% (4 d.f.)
		½ plot:	1.196 tons per acre or 9.2% (4 d.f.)
		⅛ plot:	1.161 tons per acre or 8.9% (24 d.f.)
Barley.	Grain (at 85% dry matter).	Whole plot:	3.56 cwt per acre or 12.2% (4 d.f.)
		½ plot:	0.83 cwt per acre or 2.8% (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
915	1638	1753

Lucerne, dry matter: cwt per acre

	1st cut	2nd cut	3rd cut	Total
1st year				
Dung in 1959: tons per acre				
None	18.2			18.2
15	23.1			23.1
Difference	+4.9			+4.9
Previous rotation				
Lucerne	19.9			19.9
Arable with roots	21.3			21.3
Mean	20.6			20.6
2nd year				
Dung in 1958: tons per acre				
None	12.4	14.1	6.0	32.5
15	24.0	18.7	9.0	51.7
Difference	+11.6	+4.6	+3.0	+19.2
Previous rotation				
Lucerne	16.2	14.3	6.9	37.4
Arable with hay	20.1	18.5	8.1	46.7
Mean	18.2	16.4	7.5	42.0
3rd year				
Dung in 1957				
None	9.8	14.3	11.2	35.3
15	16.7	19.1	13.8	49.6
Difference	+6.9	+4.8	+2.6	+14.3
Previous rotation				
Lucerne	10.6	16.2	17.1	43.9
Arable with roots	15.9	17.2	7.9	41.0
Mean	13.2	16.7	12.5	42.4

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware ($1\frac{5}{8}$" riddle)	Grain: (at 85% D.M.) cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	11.38	97.6	24.8	37.8
15*	13.34	97.4	25.3	39.8
Difference	+1.96	-0.2	+0.5	+2.0
Previous rotation				
Ley	13.65	97.9	26.8	39.3
Lucerne	13.40	97.4	25.8	41.0
Arable with hay	10.74	96.5	22.4	35.8
Arable with roots	11.67	98.0	25.2	39.3
Mean	12.36	97.5	25.1	38.8

Hay

Yield, dry matter: cwt per acre

	1st cut	2nd cut	Total
Dung in 1957: tons per acre			
None	62.6	9.8	72.4
15	66.6	13.2	79.8
Difference	+4.0	+3.4	+7.4
Previous rotation			
Ley	66.8	12.2	79.0
Arable with hay	62.4	10.8	73.2
Mean	64.6	11.5	76.1

Carrots

	Roots washed: tons per acre	Tops tons per acre
Dung in 1957: tons per acre		
None	4.46	1.85
15	6.02	2.54
Difference	1.56	0.69
Previous rotation		
Lucerne	5.34	2.16
Arable with roots	5.14	2.22
Mean	5.24	2.20

*Dung applied: Potatoes for test crop sugar beet in 1959.
Rye for test crop sugar beet in 1958.

Mean dry matter % as harvested: Rye, Grain: 82.6
Straw: 93.2

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1st Test crop

Sugar beet

Previous rotation

	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Roots (washed): tons per acre					
Mean (±1.068)	17.48	16.52	15.68	15.60	16.32
Dung: tons per acre					
None (±1.271)	16.33	14.43	13.03	12.87	14.17
15	18.63	18.61	18.32	18.32	18.47
Difference (±1.376)	+2.30	+4.18	+5.29	+5.45	+4.30
Response to additional 0.72 cwt N per acre					
		(±1.040)			(±0.520)
No dung	-0.07	-0.27	+0.58	+0.19	+0.11
Dung 15 tons per acre	+0.94	-0.86	-0.46	-0.56	-0.24
Response to additional 0.9 cwt K_2O per acre					
		(±1.040)			(±0.520)
No dung	-1.63	+0.31	+0.26	+0.41	-0.17
Dung 15 tons per acre	+0.60	-0.04	+1.58	-1.60	+0.14
Sugar Percentage					
Mean	16.6	16.3	16.2	16.5	16.4
Dung: tons per acre					
None	16.6	16.3	16.0	16.2	16.3
15	16.6	16.2	16.5	16.9	16.5
Difference	0.0	-0.1	+0.5	+0.7	+0.2
Response to additional 0.72 cwt N per acre					
No dung	-1.0	-0.9	-0.9	-1.0	-1.0
Dung 15 tons per acre	-1.3	-1.1	-0.2	-0.5	-0.7
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.1	-0.1	-0.1	-0.6	-0.1
Dung 15 tons per acre	+0.2	+0.1	+0.2	+0.3	+0.3

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1st Test Crop

Sugar beet

Previous rotation

	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Total sugar: cwt per acre					
Mean (±3.01)	57.9	53.7	51.0	51.7	53.6
Dung: tons per acre					
None (±3.71)*	54.0	47.1	41.6	41.6	46.1
15	61.7	60.3	60.3	61.8	61.1
Difference (±4.34)	+7.7	+13.2	+18.7	+20.2	+15.0 (±2.17)
Response to additional 0.72 cwt N per acre		(±3.44)			(±1.72)
No dung	-3.7	-3.4	-0.6	-2.3	-2.5
Dung 15 tons per acre	-1.6	-7.1	-1.9	-3.6	-3.5
Response to additional 0.9 cwt K_2O per acre		(±3.44)			(±1.72)
No dung	-4.6	+1.0	+0.4	0.0	-0.8
Dung 15 tons per acre	+2.5	+0.5	+5.9	-4.4	+1.1
Tops: tons per acre					
Mean (±1.002)	12.75	13.67	13.39	12.24	13.01
Dung: tons per acre					
None (±1.167)*	12.57	13.03	12.44	11.66	12.42
15	12.93	14.31	14.35	12.82	13.60
Difference (±1.196)	+0.36	+1.28	+1.91	+1.16	+1.18 (±0.598)
Response to additional 0.72 cwt N per acre		(±0.821)			(±0.410)
No dung	+3.14	+3.62	+3.22	+4.15	+3.53
Dung 15 tons per acre	+2.96	+1.88	+2.80	+2.23	+2.47
Response to additional 0.9 cwt K_2O per acre		(±0.821)			(±0.410)
No dung	+0.96	-0.62	+0.54	-0.41	+0.13
Dung 15 tons per acre	-1.32	-0.06	+1.88	+0.07	+0.14

*For use in horizontal and diagonal comparisons only.

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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 roots	Mean
Roots (washed): tons per acre						
Mean	(±1.101)	17.50	16.61	14.82	16.28	16.30
None	(±1.468)*	16.89	14.25	12.00	12.88	14.00
15		18.11	18.97	17.64	19.69	18.60
Difference	(±1.875)	+1.22	+4.72	+5.64	+6.81	+4.60
Sugar percentage						
Mean		17.1	16.6	16.7	17.0	16.8
None		17.1	17.1	16.6	17.1	17.0
15		17.0	16.2	16.8	16.9	16.7
Difference		-0.1	-0.9	+0.2	-0.2	-0.3
Total sugar: cwt per acre						
Mean	(±3.36)	59.7	55.0	49.4	55.1	54.8
None	(±4.49)*	57.9	48.5	39.8	44.0	47.5
15		61.4	61.5	59.0	66.3	62.0
Difference	(±6.05)	+3.5	+13.0	+19.2	+22.3	+14.5
Tops: tons per acre						
Mean	(±0.966)	10.91	12.03	11.58	11.16	11.42
None	(±1.288)*	10.54	10.79	10.78	9.93	10.51
15		11.27	13.27	12.38	12.38	12.32
Difference	(±1.562)	+0.73	+2.48	+1.60	+2.45	+1.81

*For use in horizontal and diagaonal comparisons only.

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2nd Test Crop

Barley

Previous rotation

Dung in 1960: tons per acre	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Grain (at 85% dry matter): cwt per acre					
None (±2.55)*	30.6	25.2	26.5	29.4	27.9
15	31.3	30.0	29.8	31.8	30.7
Mean (±2.41)	30.9	27.6	28.1	30.6	29.3
Difference (±0.83)	+0.7	+4.8	+3.3	+2.4	+2.8 (±0.42)
Straw (at 85% dry matter): cwt per acre					
None	24.2	15.8	16.7	18.7	18.8
15	25.6	20.1	20.9	21.5	22.0
Mean	24.9	17.9	18.8	20.1	20.4
Difference	+1.4	+4.3	+4.2	+2.8	+3.2

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 82.8
Straw 80.8

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