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Yields of the Field Experiments 1952

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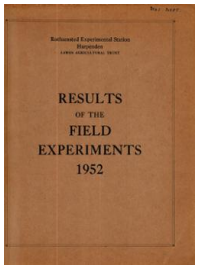

52/BB/1 Deep Cultivation Rotation - Rothamsted

Rothamsted Research

Rothamsted Research (1953) *52/BB/1 Deep Cultivation Rotation - Rothamsted ;* Yields Of The Field Experiments 1952, pp 27 - 33 **- DOI: https://doi.org/10.23637/ERADOC-1-178**

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52/Bb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 9th Year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1952.

For details of rotation and treatments etc. see "Results of the Field Experiments 1939-47".

Area of each plot: 0.0312 acre. Area harvested: Sugar beet (half plot), 0.0119 acre; barley, wheat, spring oats, 0.0265 acre; ley, 0.0275 acre; potatoes (half plot), 0.0107 acre.

Cultivations, etc.:

Sugar beet (Series 1)

Fertilizers for ploughing in applied: Sept 28, 1951. Dung applied and ploughed in 'deep': Oct 9. Dung applied and ploughed in 'shallow': Oct 10. Fertilizers for surface application broadcast, seed drilled at 16 lb per acre: Mar 22, 1952. Singled: May 26. Lifted: Jan 2, 1953. Variety: Klein E.

Barley (Series 6)

Ploughed: Dec 18, 1951. Ground chalk applied at 1 ton per acre: Feb 25, 1952. Basic slag and sulphate of ammonia applied: Feb 27. Seed drilled at 3 bushels per acre: Feb 28. Harvested: July 31. Variety: Plumage Archer.

Ley (Series 2)

Seeds undersown in barley: Apr 18, 1951. Out: June 24, 1952. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat (Series 3)

Ploughed 'deep' plots: July 30, 1951. Ploughed 'shallow' plots: Aug 8. Ploughed all plots: Sept 25. Seed drilled at 3 bushels per acre: Oct 20. Basal sulphate of ammonia applied: Apr 16, 1952. Harvested: July 26. Variety: Yeoman.

Potatoes (Series 4)

Fertilizers for ploughing in applied: Sept 28, 1951. Dung applied and ploughed in 'deep': Oct 9. Dung applied and ploughed in 'shallow': Oct 10. Ridged: May 1, 1952. Fertilizers applied in ridges, potatoes planted: May 2. Earthed up ridges: July 10. Sprayed with copper fungicide 5 lb per acre: Aug 12 and again Sept 3. Sprayed with sulphuric acid, 20% B.O.V: Sept 23. Lifted: Oct 18. Variety: Majestic.

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Spring oats (Series 5)
Ploughed: Oct 29, 1951. Ground chalk applied at 1 ton per acre: Feb 25, 1952. Basal sulphate of ammonia drilled: Feb 27. Seed drilled at $3\frac{1}{2}$ bushels per acre: Feb 28. Harvested: July 22.
Variety: Star.

Standard errors per plot:

Sugar beet,	Total sugar,	whole plot:	2.49 cwt per acre or 4.4%	(4 d.f)
		sub-plot:	3.65 cwt per acre or 6.5%	(7 d.f)
Barley,	Grain:		2.16 cwt per acre or 8.4%	(4 d.f)
Ley,	Hay:		2.48 cwt per acre or 4.0%	(4 d.f)
Wheat,	Grain:		2.34 cwt per acre or 6.9%	(4 d.f)
Potatoes,	Total tubers,	whole plot:	0.510 tons per acre or 7.3%	(4 d.f)
		sub-plot:	1.093 tons per acre or 15.7%	(7 d.f)
Spring oats,	Grain:		2.84 cwt per acre or 8.3%	(4 d.f)

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Summary of Results

Series 1: Sugar Beet

Responses to treatments

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Roots (washed): Mean yield 17.83 tons per acre									
Ploughing deep-shallow	+2.91	-	-	+3.42	+2.40	+2.85	+2.97	+2.60	+3.22
Dung	+3.63	+4.14	+3.12	-	-	+3.94	+3.32	+4.78	+2.48
Phosphate	+0.24	+0.18	+0.30	+0.55	-0.07	-	-	-0.02	+0.50
Potash	+1.07	+0.76	+1.38	+2.22	-0.08	+0.81	+1.33	-	-
Sugar Percentage: Mean 15.77									
Ploughing deep-shallow	-0.13	-	-	-0.08	-0.18	-0.05	-0.21	-0.20	-0.06
Dung	-0.16	-0.11	-0.21	-	-	-0.34	+0.02	-0.19	-0.13
Phosphate	+0.06	+0.14	-0.02	-0.12	+0.24	-	-	+0.26	-0.14
Potash	-0.07	-0.14	0.00	-0.10	-0.04	+0.13	-0.27	-	-
Total Sugar: Mean yield 56.2 cwt per acre									
	(±1.25)					(±1.76)			
Ploughing deep-shallow	8.7	-	-	10.6	6.8	8.8	8.6	7.5	9.9
Dung	10.9	12.8	9.0	-	-	11.2	10.6	14.5	7.3
Phosphate	1.0	1.1	0.9	1.3	0.7	-	-	1.0	1.0
Potash	3.2	2.0	4.4	6.8	-0.4	3.2	3.2	-	-
Plant Number: Mean 26.6 thousands per acre									
Ploughing deep-shallow	+1.2	-	-	+1.2	+1.2	+1.4	+1.0	+0.9	+1.5
Dung	+0.1	+0.1	+0.1	-	-	+0.5	-0.3	+0.3	-0.1
Phosphate	-0.6	-0.4	-0.8	-0.2	-1.0	-	-	-0.9	-0.3
Potash	+0.2	-0.1	+0.5	+0.4	0.0	-0.1	+0.5	-	-
Noxious Nitrogen: Mean 25.0 mg. per 100 g.									
Ploughing deep-shallow	+0.6	-	-	+1.2	0.0	+0.6	+0.6	-0.6	+1.8
Dung	+2.5	+3.1	+1.9	-	-	+1.9	+3.1	+1.9	+3.1
Phosphate	-1.9	-1.9	-1.9	-2.5	-1.3	-	-	-1.9	-1.9
Potash	+0.6	-0.6	+1.8	0.0	+1.2	+0.6	+0.6	-	-

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Series 1: Sugar beet

	Phosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Roots (washed): tons per acre							
Shallow	16.28	16.98	15.95	16.00	17.42	16.09	16.37
Deep	19.13	19.32	19.55	18.59	19.89	20.06	19.28
No dung	15.74	16.36	16.22	14.91	17.18	17.07	16.02
Dung	19.68	19.94	19.28	19.68	20.13	19.08	19.64
Mean	17.71	18.15	17.75	17.29	18.65	18.08	17.83
Sugar Percentage							
Shallow	15.76	15.64	16.16	15.90	15.70	15.82	15.83
Deep	15.71	15.71	15.69	15.71	15.62	15.79	15.71
No dung	15.91	15.58	16.00	15.90	15.77	15.82	15.85
Dung	15.57	15.77	15.84	15.71	15.55	15.78	15.69
Mean	15.74	15.68	15.92	15.80	15.66	15.80	15.77
Total Sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	51.3	53.2	51.5	50.8	54.7	50.9	51.8
Deep	60.1	60.7	61.3	58.3	62.1	63.3	60.5
No dung	50.1	51.0	51.8	47.4	54.2	54.1	50.7
Dung	61.3	62.9	61.0	61.8	62.6	60.2	61.6
Mean	55.7	56.9	56.4	54.6	58.4	57.1	56.2
Plant Number: thousands per acre							
Shallow	26.2	25.8	25.8	26.1	25.9	26.0	26.0
Deep	27.6	26.9	26.7	26.9	27.2	27.8	27.2
No dung	26.7	26.6	26.2	26.3	26.7	26.9	26.6
Dung	27.1	26.1	26.2	26.6	26.4	26.9	26.6
Mean	26.9	26.3	26.2	26.5	26.5	26.9	26.6

(a) ±1.25 for use in comparisons other than horizontal.
(b) ±1.82 for use in horizontal comparisons.
(c) ±1.79 as (a).

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Series 1: Sugar beet

	Phosphate None	Phosphate Ploughed in	Phosphate In seed bed	Potash None	Potash Ploughed in	Potash In seed bed	Mean
Noxious Nitrogen: mg. per 100 mg.							
Shallow	25.6	23.8	23.8	25.0	25.0	23.8	24.7
Deep	26.2	25.0	23.8	24.4	27.5	25.0	25.3
No dung	25.0	22.5	22.5	23.8	23.8	23.8	23.8
Dung	26.9	26.2	25.0	25.6	28.8	25.0	26.2
Mean	25.9	24.4	23.8	24.7	26.2	24.4	25.0

Series 6: Barley

Responses to treatments to previous Sugar Beet

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 25.7 cwt per acre									
	(±1.08)				(±1.53)				
Ploughing deep-shallow	-2.6	-	-	-1.3	-3.9	-3.0	-2.2	-3.7	-1.5
Dung	+1.5	+2.8	+0.2	-	-	+1.9	+1.1	+2.6	+0.4
Phosphate	+0.2	-0.2	+0.6	+0.6	-0.2	-	-	-0.2	+0.6
Potash	+1.1	0.0	+2.2	+2.2	0.0	+0.7	+1.5	-	-
Straw: Mean yield 26.5 cwt per acre									
Ploughing deep-shallow	-2.6	-	-	-0.9	-4.3	-2.9	-2.3	-3.4	-1.8
Dung	+3.4	+5.1	+1.7	-	-	+3.5	+3.3	+4.2	+2.6
Phosphate	+0.3	0.0	+0.6	+0.4	+0.2	-	-	0.0	+0.6
Potash	+0.5	-0.3	+1.3	+1.3	-0.3	+0.2	+0.8	-	-

Series 2: Ley

Hay: Mean yield 62.5 cwt per acre

	(±1.24)				(±1.75)				
Ploughing deep-shallow	-0.1	-	-	-0.7	+0.5	+0.1	-0.3	-2.7	+2.5
Dung	+4.8	+4.2	+5.4	-	-	+4.1	+5.5	+6.1	+3.5
Phosphate	-0.6	-0.4	-0.8	-1.3	+0.1	-	-	-2.7	+1.5
Potash	+1.3	-1.3	+3.9	+2.6	0.0	-0.8	+3.4	-	-

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Series 3: Wheat

Responses to treatments*

Response to	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 33.7 cwt per acre									
	(±1.17)				(±1.66)				
Ploughing deep-shallow	+0.1	-	-	0.0	+0.2	-1.0	+1.2	+0.7	-0.5
Dung	+0.7	+0.6	+0.8	-	-	-0.1	+1.5	-1.7	+3.1
Phosphate	-1.6	-2.7	-0.5	-2.4	-0.8	-	-	+0.9	-4.1
Potash	-1.0	-0.4	-1.6	-3.4	+1.4	+1.5	-3.5	-	-
Straw: Mean yield 62.3 cwt per acre									
Ploughing deep-shallow	+5.1	-	-	+2.6	+7.6	-0.3	+10.5	+6.0	+4.2
Dung	+5.4	+2.9	+7.9	-	-	+8.7	+2.1	+1.3	+9.5
Phosphate	-4.7	-10.1	+0.7	-1.4	-8.0	-	-	-4.2	-5.2
Potash	+2.8	+3.7	+1.9	-1.3	+6.9	+3.3	+2.3	-	-

* Cultivation treatments direct to wheat, remainder to previous sugar beet.

Series 4: Potatoes

Total tubers: Mean yield 6.96 tons per acre									
	(±0.255)				(±0.361)				
Ploughing deep-shallow	-1.27	-	-	-1.38	-1.16	-1.27	-1.27	-1.35	-1.19
Dung	+2.54	+2.43	+2.65	-	-	+2.10	+2.98	+3.60	+1.48
Phosphate	+1.61	+1.61	+1.61	+1.17	+2.05	-	-	+0.72	+2.50
Potash	+0.99	+0.91	+1.07	+2.05	-0.07	+0.10	+1.88	-	-
Percentage Ware: Mean 76.0									
Ploughing deep-shallow	-1.0	-	-	-2.8	+0.8	-1.1	-0.9	-1.9	-0.1
Dung	+8.0	+6.2	+9.8	-	-	+6.8	+9.2	+10.2	+5.8
Phosphate	-2.9	-3.0	-2.8	-4.1	-1.7	-	-	-1.3	-4.5
Potash	+5.4	+4.5	+6.3	+7.6	+3.2	+7.0	+3.8	-	-

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Series 4: Potatoes

	Phosphate None	Phosphate Ploughed in	Phosphate In ridges	Potash None	Potash Ploughed in	Potash In ridges	Mean
Total tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	6.79	7.78	9.03	7.15	6.99	9.11	7.60
Deep	5.53	6.27	8.00	5.80	6.11	7.62	6.33
No dung	5.11	5.32	7.25	4.67	5.81	7.62	5.70
Dung	7.21	8.73	9.79	8.27	7.29	9.11	8.23
Mean	6.16	7.03	8.52	6.47	6.55	8.36	6.96
Percentage Ware							
Shallow	78.0	76.0	74.0	74.2	78.1	79.4	76.5
Deep	76.8	72.1	76.1	72.3	76.9	80.4	75.5
No dung	74.0	69.6	70.3	68.2	75.4	76.2	72.0
Dung	80.9	78.6	79.7	78.4	79.6	83.6	80.0
Mean	77.4	74.1	75.0	73.3	77.5	79.9	76.0

Series 5: Spring Oats

Responses to treatments to previous potatoes

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 34.4 cwt per acre									
	(±1.42)				(±2.01)				
Ploughing deep-shallow	-4.0	-	-	-1.9	-6.1	-4.3	-3.7	-3.3	-4.7
Dung	-1.1	+1.0	-3.2	-	-	-0.5	-1.7	-1.2	-1.0
Phosphate	+1.7	+1.4	+2.0	+2.3	+1.1	-	-	+0.3	+3.1
Potash	-1.4	-0.7	-2.1	-1.5	-1.3	-2.8	0.0	-	-
Straw: Mean yield 43.6 cwt per acre									
Ploughing deep-shallow	-3.4	-	-	-1.8	-5.0	-4.1	-2.7	-2.9	-3.9
Dung	+4.1	+5.7	+2.5	-	-	+4.3	+3.9	+2.7	+5.5
Phosphate	+0.9	+0.2	+1.6	+1.1	+0.7	-	-	-0.1	+1.9
Potash	-0.2	+0.3	-0.7	-1.6	+1.2	-1.2	+0.8	-	-

(a) ±0.255 for use in comparisons other than horizontal.
(b) ±0.547 for use in horizontal comparisons.
(c) ±0.463 as (a).