

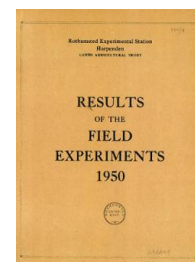
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## Yields of the Field Experiments 1950

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### 50/BB/1 Deep Cultivation - Rothamsted

#### Rothamsted Research

Rothamsted Research (1951) *50/BB/1 Deep Cultivation - Rothamsted* ; Yields Of The Field Experiments 1950, pp 25 - 32 - DOI: <https://doi.org/10.23637/ERADOC-1-185>

## DEEP CULTIVATION ROTATION EXPERIMENT

### The 7th Year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1950.

For details of rotation and treatments etc see Appendix Z.

Area of each plot: 0.03125 acre. Area harvested: wheat, spring oats, barley, 0.02652 acre; ley 0.02750 acre; sugar beet (half plot), 0.01186 acre; potatoes (half plot), 0.01068 acre.

#### Cultivations, etc:

##### Sugar Beet (Series 2)

Artificially applied "early": Sept 7. Dung applied: Sept 12.  
Ploughed deep and shallow: Sept 13. Cultivated: Jan 16.  
Ploughed: Jan 17. Cultivated: Mar 21. Springtined: Mar 22.  
Harrowed: Mar 27. Artificially applied "late", ring rolled:  
Mar 28. Seed drilled and harrowed in: Mar 29. Rolled:  
Mar 30. Hoed: May 17. Singled: June 2-6. Hoed: June 6, 8  
and 30, and July 13. Lifted: Nov 3. Variety: Klein E.  
Previous crop: Spring Oats.

##### Barley (Series 3)

Ploughed: Dec 9-13. Slag applied: Mar 6. Springtined:  
Mar 8 and again Mar 11. Sulphate of ammonia applied,  
harrowed, seed drilled, harrowed in and rolled: Mar 10.  
Seeds mixture undersown, harrowed in and rolled: Mar 22.  
Harvested: Aug 1. Variety: Plumage Archer. Previous crop:  
Sugar Beet.

##### Ley (Series 4)

Seeds mixture undersown in barley, harrowed in and rolled:  
Apr 14, 1949. Rolled: Mar 15, 1950. Cut: June 9. Seeds  
mixture per acre: 14 lb ryegrass (S24), 4 lb English red  
clover (Montgomery), 1 lb American Alsike Clover. Previous  
crop: Barley.

##### Wheat (Series 5)

Deep ploughed: July 6-7. Shallow ploughed: July 9.  
Cultivated: Oct 13. Disced, rolled and springtined: Oct 14.  
Springtined: Oct 15. Harrowed: Oct 28. Seed drilled and  
harrowed in: Oct 29. Harrowed: Mar 16. Ring rolled: Apr 20.  
Sulphate of ammonia applied: May 3. Harvested: Aug 4. Variety:  
Yeoman. Previous crop: Ley.

##### Potatoes (Series 1)

Artificially applied "early": Sept 7. Dung applied, deep and  
shallow ploughed: Sept 12. Cultivated: Jan 16. Ploughed:  
Jan 17-19. Cultivated: Mar 21. Springtined: Mar 22.  
Harrowed: Mar 27. Ring rolled twice and harrowed: Mar 28.  
Ridged: Apr 3. Artificially applied to ridges, planted and  
covered in: Apr 4. Rolled down ridges: Apr 6. Harrowed  
ridges: May 5. Grubbed: May 24. Hoed weeds: June 21. Earthed  
up: June 26. Sprayed with Perenox: July 24. Sprayed with  
Copperan: Aug 18. Sprayed with B.O.V. 15% to kill off haulm:  
Sept 21. Lifted: Oct 9. Variety: Majestic. Previous crop:  
Wheat.

50/Bb/1.2

Spring Oats (Series 6).

Ploughed: Oct 13 and again Jan 16-19. Springtined: Mar 8 and again  
Mar 10. Sulphate of ammonia and seed drilled, harrowed in:  
Mar 10. Ring rolled: Mar 11. Harvested: Aug 4. Variety:  
Star. Previous crop: Potatoes.

Standard errors per plot:

Sugar beet	Total sugar,	whole plot, 3.06 cwt per acre or 4.5% (4 d.f.)
		sub-plot, 2.81 cwt per acre or 4.1% (7 d.f.)
	Tops,	whole plot, 1.52 tons per acre or 7.2% (4 d.f.)
		sub-plot, 0.670 tons per acre or 3.2% (6 d.f.)
Barley	Grain,	1.16 cwt per acre or 3.5% (4 d.f.)
Ley		7.60 cwt per acre or 15.2% (4 d.f.)
Wheat	Grain,	1.45 cwt per acre or 4.0% (4 d.f.)
Potatoes	Ware tubers,	whole plot, 0.604 tons per acre or 4.0% (4 d.f.)
		sub-plot, 1.07 tons per acre or 7.1% (7 d.f.)
Spring oats	Grain,	2.47 cwt per acre or 6.7% (4 d.f.)



Summary of Results

Series 2: Sugar Beet

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pros.	Abs.	Pros.	Abs.	Pros.
Total Sugar: Mean yield 68.1 cwt per acre									
	(±1.53)	(±2.17)							
Ploughing deep-shallow	-4.0	-	-	-2.3	-5.7	-2.5	-5.5	-2.7	-5.3
Dung	6.6	8.3	4.9	-	-	9.5	3.7	5.8	7.4
Phosphate	0.6	2.1	-0.9	3.5	-2.3	-	-	0.4	0.8
Potash	1.0	2.3	-0.3	0.2	1.8	0.8	1.2	-	-

Roots (washed): Mean yield 19.91 tons per acre

Ploughing deep-shallow	-0.76	-	-	-0.37	-1.15	-0.63	-0.89	-0.46	-1.06
Dung	2.17	2.56	1.78	-	-	2.96	1.38	1.91	2.43
Phosphate	-0.01	0.12	-0.14	0.78	-0.80	-	-	-0.01	-0.01
Potash	0.23	0.53	-0.07	-0.03	0.49	0.23	0.23	-	-

Sugar Percentage: Mean 17.10

Ploughing deep-shallow	-0.36	-	-	-0.28	-0.44	-0.10	-0.62	-0.32	-0.40
Dung	-0.21	-0.13	-0.29	-	-	-0.16	-0.26	-0.18	-0.24
Phosphate	0.14	0.40	-0.12	0.19	0.09	-	-	0.09	0.19
Potash	0.06	0.10	0.02	0.09	0.03	0.01	0.11	-	-

Tops: Mean yield 24.04 tons per acre

	(±0.761)	(±1.076)							
Ploughing deep-shallow	2.27	-	-	1.80	2.74	1.13	3.41	2.30	2.24
Dung	3.66	3.19	4.13	-	-	3.86	3.46	4.59	2.73
Phosphate	-0.92	-2.06	0.22	-0.72	-1.12	-	-	-1.04	-0.80
Potash	0.58	0.61	0.55	1.51	-0.35	0.46	0.70	-	-

Plant Number: Mean 25.3 thousands per acre

Ploughing deep-shallow	1.2	-	-	0.8	1.6	1.8	0.6	1.6	0.8
Dung	-0.6	-1.0	-0.2	-	-	-0.7	-0.5	0.0	-1.2
Phosphate	0.4	1.0	-0.2	0.3	0.5	-	-	0.7	0.1
Potash	0.3	0.7	-0.1	0.9	-0.3	0.6	0.0	-	-

Noxious Nitrogen: Mean 30.3 mgs. %

Ploughing deep-shallow	2.3	-	-	0.6	4.0	-1.6	6.2	1.4	3.2
Dung	4.8	3.1	6.5	-	-	4.6	5.0	3.1	6.5
Phosphate	0.1	-3.8	4.0	-0.1	0.3	-	-	-3.8	4.0
Potash	-0.7	-1.6	0.2	-2.4	1.0	-4.6	3.2	-	-

Series 2: Sugar Beet

	Phosphate			Potash			Mean
	None	Ploughed In seed in bed		None	Ploughed In seed in bed		
Total sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	69.1	73.3	68.9	68.9	70.8	71.7	70.1
Deep	66.5	66.8	64.5	66.2	65.0	67.0	66.1
No dung	63.1	69.0	64.1	64.7	64.7	65.1	64.8
Dung	72.5	71.2	69.3	70.4	71.1	73.6	71.4
Mean	67.8	70.1	66.7	67.6	67.9	69.3	68.1

Roots (washed): tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	20.23	21.09	19.62	20.02	20.61	20.50	20.29
Deep	19.60	19.78	19.14	19.57	19.41	19.57	19.53
No dung	18.43	19.95	18.49	18.84	18.93	18.69	18.83
Dung	21.39	20.92	20.27	20.75	21.09	21.39	20.99
Mean	19.91	20.43	19.38	19.80	20.01	20.04	19.91

Sugar Percentage							
Shallow	17.08	17.40	17.56	17.23	17.18	17.48	17.28
Deep	16.98	16.88	16.84	16.91	16.75	17.11	16.92
No dung	17.11	17.28	17.32	17.16	17.07	17.42	17.20
Dung	16.95	17.01	17.08	16.98	16.85	17.17	17.00
Mean	17.03	17.14	17.20	17.07	16.96	17.30	17.10

Tops: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	20.94	18.93	18.83	19.61	20.09	20.33	19.91
Deep	22.07	22.28	22.29	21.90	22.54	22.37	22.18
No dung	19.58	19.32	18.39	18.46	20.47	19.47	19.21
Dung	23.43	21.90	22.73	23.05	22.16	23.23	22.87
Mean	21.50	20.61	20.56	20.76	21.31	21.35	21.04

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for use in all other comparisons.

Standard errors:	(a)	(b)	(c)
Total Sugar	1.53	1.41	1.83
Tops	0.761	0.335	0.797



Series 2: Sugar Beet

50/Bb/1.5

	None	Phosphate		None	Potash		Mean
		Ploughed in	In seed bed		Ploughed in	In seed bed	
Plant Number: thousands per acre							
Shallow	24.2	24.9	25.5	24.4	24.7	25.4	24.7
Deep	26.0	26.7	25.0	26.0	26.3	25.4	25.9
No dung	25.5	26.5	25.1	25.2	26.5	25.6	25.6
Dung	24.8	25.1	25.5	25.2	24.6	25.2	25.0
Mean	25.1	25.8	25.3	25.2	25.5	25.4	25.3

Noxious Nitrogen: mg. %

Shallow	31.1	28.8	25.8	30.0	30.2	26.5	29.2
Deep	29.5	36.2	30.8	31.4	33.8	29.5	31.5
No dung	28.0	30.0	25.8	29.1	27.0	26.5	27.9
Dung	32.6	35.0	30.8	32.2	37.0	29.5	32.8
Mean	30.3	32.5	28.2	30.7	32.0	28.0	30.3

Series 3: Barley

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grains: Mean yield 33.1 cwt per acre									
(±0.58) (±0.82)									
Ploughing deep-shallow	-0.1	-	-	-1.5	1.3	0.1	-0.3	-0.2	0.0
Dung	1.3	-0.1	2.7	-	-	1.3	1.3	1.0	1.6
Phosphate	0.1	0.3	-0.1	0.1	0.1	-	-	1.2	-1.0
Potash	-0.1	-0.2	0.0	-0.4	0.2	1.0	-1.2	-	-

Straw: Mean yield 46.5 cwt per acre

Ploughing deep-shallow	-0.5	-	-	-0.7	-0.3	-1.2	0.2	0.1	-1.1
Dung	3.2	3.0	3.4	-	-	3.1	3.3	3.8	2.6
Phosphate	-1.0	-1.7	-0.3	-1.1	-0.9	-	-	0.8	-2.8
Potash	0.4	1.0	-0.2	1.0	-0.2	2.2	-1.4	-	-

50/Bb/1.6

Series 4: Ley

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Hay: Mean yield 50.1 cwt per acre									
(±3.80) (±5.37)									
Ploughing deep-shallow	-8.8	-	-	-10.4	-7.2	-13.3	-4.3	-10.7	-6.9
Dung	3.7	2.1	5.3	-	-	3.9	3.5	5.3	2.1
Phosphate	4.7	0.2	9.2	4.9	4.5	-	-	6.6	2.8
Potash	6.1	4.2	8.0	7.7	4.5	8.0	4.2	-	-

Series 5: Wheat

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grain: Mean yield 36.6 cwt per acre									
(±0.72) (±1.02)									
Ploughing deep-shallow	0.1	-	-	-0.4	0.6	-0.1	0.3	-1.2	1.4
Dung	0.6	0.1	1.1	-	-	1.6	-0.4	1.9	-0.7
Phosphate	1.0	0.8	1.2	2.0	0.0	-	-	1.0	1.0
Potash	0.2	-1.1	1.5	1.5	-1.1	0.2	0.2	-	-

Straw: Mean yield 56.1 cwt per acre

Ploughing deep-shallow	3.8	-	-	2.5	5.1	5.5	2.1	3.0	4.6
Dung	1.3	0.0	2.6	-	-	2.8	-0.2	2.8	-0.2
Phosphate	1.4	3.1	-0.3	2.9	-0.1	-	-	1.1	1.7
Potash	-0.3	-1.1	0.5	1.2	-1.8	-0.6	0.0	-	-



50/Bb/1.7

Series 1: Potatoes

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Ware Tubers: Mean yield 15.13 tons per acre									
	(±0.302)	(±0.427)							
Ploughing deep-shallow	0.19	-	-	0.21	0.17	0.62	-0.24	0.52	-0.14
Dung	2.37	2.39	2.35	-	-	2.49	2.25	4.41	0.33
Phosphate	0.38	0.81	-0.05	0.50	0.26	-	-	0.97	-0.21
Potash	2.04	2.37	1.71	4.08	0.00	2.63	1.45	-	-

Percentage ware: Mean 88.9

Ploughing deep-shallow	-0.1	-	-	2.0	-2.2	-1.1	0.9	1.0	-1.2
Dung	0.7	2.8	-1.4	-	-	-0.1	1.5	3.3	-1.9
Phosphate	-0.5	-1.5	0.5	-1.3	0.3	-	-	-0.3	-0.7
Potash	0.9	2.0	-0.2	3.5	-1.7	1.1	0.7	-	-

	None	Phosphate Ploughed In in ridges		None	Potash Ploughed In in ridges		Mean
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Ware Tubers: tons per acre

	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	14.63	15.29	15.60	13.85	16.39	16.05	15.04
Deep	15.25	14.99	15.41	14.37	15.43	16.72	15.23
No dung	13.70	14.11	14.28	11.91	16.08	15.89	13.95
Dung	16.18	16.16	16.73	16.32	15.74	16.89	16.32
Mean	14.94	15.14	15.51	14.11	15.91	16.39	15.13

Percentage ware

Shallow	89.7	88.6	88.0	88.0	89.6	90.5	89.0
Deep	88.6	89.0	89.3	89.0	87.8	89.8	88.9
No dung	89.2	88.5	87.4	86.8	90.0	90.8	88.6
Dung	89.1	89.1	89.8	90.1	87.4	89.5	89.3
Mean	89.2	88.8	88.6	88.5	88.7	90.1	88.9

Standard error (b) is for use in horizontal comparisons only; standard errors (a) and (c) for use in all other comparisons.

Standard errors (a) ±0.302 (b) ±0.537 (c) ±0.485



50/Bb/1.8

Series 6: Oats

Responses to treatments

	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grain: Mean yield 37.0 cwt per acre									
	(±1.24)			(±1.75)					
Ploughing deep-shallow	-2.3	-	-	-2.7	-1.9	-1.8	-2.8	-2.8	-1.8
Dung	0.5	0.1	0.9	-	-	0.8	0.2	0.1	0.9
Phosphate	-0.1	0.4	-0.6	0.2	-0.4	-	-	-0.4	0.2
Potash	0.5	0.0	1.0	0.1	0.9	0.2	0.8	-	-
Straw: Mean yield 53.2 cwt per acre									
Ploughing deep-shallow	-1.4	-	-	0.3	-3.1	-2.0	-0.8	-0.7	-2.1
Dung	5.2	6.9	3.5	-	-	5.2	5.2	7.8	2.6
Phosphate	1.4	0.8	2.0	1.4	1.4	-	-	0.9	1.9
Potash	1.0	1.7	0.3	3.6	-1.6	0.5	1.5	-	-