

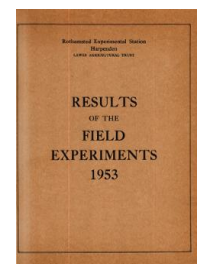
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Yields of the Field Experiments 1953

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53/BB/1 Deep Cultivation Rotation - Rothamsted

Rothamsted Research

Rothamsted Research (1954) *53/BB/1 Deep Cultivation Rotation - Rothamsted* ; Yields Of The Field Experiments 1953, pp 26 - 32 - DOI: <https://doi.org/10.23637/ERADOC-1-173>

53/Bb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 10th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1953.

For details of rotation and treatments, etc., see "Results of the Field Experiments, 1939-47" Vol. I, Section Bc/1.

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

Cultivations, etc.:

Sugar beet (Series 5)

Dung and fertilizers for ploughing in deep applied: Sept 9, 1952. Ploughed 'deep' plots: Oct 7. Dung and fertilizers for ploughing in shallow applied: Oct 8. Ploughed 'shallow' plots: Oct 16. Fertilizers for surface application broadcast: Mar 18, 1953. Seed drilled at 18 lb per acre: Mar 26. Sprayed with D.D.T. emulsion, 3 pints in 10 gallons: May 11. Singled: June 7. Lifted: Nov 16. Variety: Klein E.

Barley (Series 1)

Ploughed: Jan 25, 1953. 20 cwt ground chalk per acre applied: Jan 30. Basic slag applied: Feb 25. Sulphate of ammonia applied: Feb 26. Seed drilled at 3 bushels per acre: Feb 27. Harvested: Aug 10. Variety: Plumage Archer.

Ley (Series 6)

Seeds undersown in barley: Apr 18, 1952. Cut: June 29, 1953. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery Red clover, 2 lb American Alsike clover.

Wheat (Series 2)

Ploughed 'deep' and 'shallow' plots: Oct 8, 1952. Seed drilled at 3 bushels per acre: Oct 30. $2\frac{1}{2}$ cwt sulphate of ammonia per acre applied: Apr 24, 1953. Harvested: Aug 15. Variety: Yeoman.

Potatoes (Series 3)

Dung and fertilizers for ploughing in deep applied: Sept 9, 1952. Ploughed 'deep' plots: Oct 7. Dung and fertilizers for ploughing in shallow applied: Oct 8. Ploughed 'shallow' plots: Oct 16. Ridged: Apr 20, 1953. Fertilizers applied in ridges, potatoes planted: Apr 21. Earthed up ridges: June 27. Sprayed with copper fungicide, $5\frac{1}{2}$ lb per acre: Aug 8. Lifted: Sept 25. Variety: Majestic.

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Spring oats (Series 4)

Ploughed: Nov 11, 1952. 19 cwt ground chalk per acre applied:
Jan 30, 1953. Basal sulphate of ammonia drilled: Feb 26.
Seed drilled at $3\frac{1}{2}$ bushels per acre: Feb 27. Harvested: Aug 8.
Variety: Star.

Standard errors per plot:

| | | | | | |
|--------------|---------------|-------------|-------|------------------------|----------|
| Sugar beet, | Total sugar, | whole plot: | 2.63 | cwt per acre or 4.8% | (4 d.f.) |
| | | sub-plot: | 5.04 | cwt per acre or 9.3% | (7 d.f.) |
| | Tops, | whole plot: | 0.797 | tons per acre or 7.6% | (4 d.f.) |
| | | sub-plot: | 0.861 | tons per acre or 8.3% | (7 d.f.) |
| Barley, | Grain: | | 0.799 | cwt per acre or 2.4% | (4 d.f.) |
| Ley, | Hay: | | 5.18 | cwt per acre or 9.1% | (4 d.f.) |
| Wheat, | Grain: | | 0.707 | cwt per acre or 1.6% | (4 d.f.) |
| Potatoes, | Total tubers, | whole plot: | 1.702 | tons per acre or 15.1% | (4 d.f.) |
| | | sub-plot: | 0.519 | tons per acre or 4.6% | (7 d.f.) |
| Spring oats, | Grain: | | 1.89 | cwt per acre or 7.3% | (4 d.f.) |

53/Bb/1.3

Summary of Results

Series 5: Sugar Beet

Responses to treatments

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------|------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |

Roots (washed): Mean yield 15.49 tons per acre

| | | | | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ploughing deep-shallow | +2.28 | - | - | +1.77 | +2.79 | +1.80 | +2.76 | +2.58 | +1.98 |
| Dung | +2.85 | +2.34 | +3.36 | - | - | +2.98 | +2.72 | +2.51 | +3.19 |
| Phosphate | +0.13 | -0.35 | +0.61 | +0.26 | 0.00 | - | - | +0.25 | +0.01 |
| Potash | +0.60 | +0.90 | +0.30 | +0.26 | +0.94 | +0.72 | +0.48 | - | - |

Sugar Percentage: Mean 17.59

| | | | | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ploughing deep-shallow | -0.10 | - | - | -0.08 | -0.12 | +0.07 | -0.27 | -0.06 | -0.14 |
| Dung | -0.29 | -0.27 | -0.31 | - | - | -0.13 | -0.45 | -0.25 | -0.33 |
| Phosphate | +0.11 | +0.28 | -0.06 | +0.27 | -0.05 | - | - | +0.15 | +0.07 |
| Potash | +0.17 | +0.21 | +0.13 | +0.21 | +0.13 | +0.21 | +0.13 | - | - |

Total Sugar: Mean yield 54.4 cwt per acre

| | (±1.32) | | | (±1.86) | | | | | |
|------------------------|---------|------|-------|---------|------|-------|------|------|-------|
| Ploughing deep-shallow | +7.7 | - | - | +6.1 | +9.3 | +6.4 | +9.0 | +8.8 | +6.6 |
| Dung | +9.2 | +7.6 | +10.8 | - | - | +10.2 | +8.2 | +8.0 | +10.4 |
| Phosphate | +0.6 | -0.7 | +1.9 | +1.6 | -0.4 | - | - | +1.2 | 0.0 |
| Potash | +2.6 | +3.7 | +1.5 | +1.4 | +3.8 | +3.2 | +2.0 | - | - |

Tops: Mean yield 10.43 tons per acre

| | (±0.399) | | | (±0.564) | | | | | |
|------------------------|----------|-------|-------|----------|-------|-------|-------|-------|-------|
| Ploughing deep-shallow | +1.32 | - | - | +1.09 | +1.55 | +1.45 | +1.19 | +1.81 | +0.83 |
| Dung | +1.36 | +1.13 | +1.59 | - | - | +1.24 | +1.48 | +0.71 | +2.01 |
| Phosphate | -0.01 | +0.12 | -0.14 | -0.13 | +0.11 | - | - | +0.18 | -0.20 |
| Potash | +0.18 | +0.67 | -0.31 | -0.47 | +0.83 | +0.37 | -0.01 | - | - |

Plant Number: Mean 23.1 thousands per acre

| | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +2.6 | - | - | +1.7 | +3.5 | +1.9 | +3.3 | +2.7 | +2.5 |
| Dung | +0.7 | -0.2 | +1.6 | - | - | +0.9 | +0.5 | +0.2 | +1.2 |
| Phosphate | -0.9 | -1.6 | -0.2 | -0.7 | -1.1 | - | - | -0.3 | -1.5 |
| Potash | +0.0 | +0.1 | -0.1 | -0.5 | +0.5 | +0.6 | -0.6 | - | - |

Noxious Nitrogen: Mean 28.4 mg. per 100 g.

| | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | -0.6 | - | - | +0.6 | -1.8 | +1.9 | -3.1 | -0.6 | -0.6 |
| Dung | 0.0 | +1.2 | -1.2 | - | - | -0.6 | +0.6 | +0.6 | -0.6 |
| Phosphate | +1.2 | +3.7 | -1.3 | +0.6 | +1.8 | - | - | +0.6 | +1.8 |
| Potash | 0.0 | 0.0 | 0.0 | +0.6 | -0.6 | -0.6 | +0.6 | - | - |

Series 5: Sugar Beet

| | Phosphate | | | Potash | | | Mean |
|-------------------------------|-----------|-------------|-------------|--------|-------------|-------------|-------|
| | None | Ploughed in | In seed bed | None | Ploughed in | In seed bed | |
| Roots (washed): tons per acre | | | | | | | |
| Shallow | 14.53 | 13.86 | 14.49 | 13.90 | 15.18 | 14.42 | 14.35 |
| Deep | 16.33 | 17.61 | 16.27 | 16.48 | 16.66 | 16.90 | 16.63 |
| No Dung | 13.94 | 14.03 | 14.36 | 13.94 | 14.17 | 14.22 | 14.06 |
| Dung | 16.92 | 17.44 | 16.40 | 16.45 | 17.67 | 17.11 | 16.92 |
| Mean | 15.43 | 15.73 | 15.38 | 15.19 | 15.92 | 15.66 | 15.49 |

| Sugar Percentage | | | | | | | |
|------------------|-------|-------|-------|-------|-------|-------|-------|
| Shallow | 17.50 | 17.91 | 17.64 | 17.53 | 17.98 | 17.50 | 17.63 |
| Deep | 17.57 | 17.36 | 17.65 | 17.48 | 17.42 | 17.78 | 17.54 |
| No Dung | 17.60 | 17.80 | 17.94 | 17.63 | 17.77 | 17.90 | 17.73 |
| Dung | 17.47 | 17.48 | 17.34 | 17.38 | 17.62 | 17.38 | 17.44 |
| Mean | 17.53 | 17.64 | 17.64 | 17.50 | 17.70 | 17.64 | 17.59 |

| Total Sugar: cwt per acre | | | | | | | |
|---------------------------|------|-------------|------|------|-------------|------|------|
| | (a) | (b) and (c) | | (a) | (b) and (c) | | |
| Shallow | 50.9 | 49.6 | 51.0 | 48.7 | 54.5 | 50.5 | 50.6 |
| Deep | 57.3 | 61.0 | 57.4 | 57.5 | 58.1 | 60.0 | 58.3 |
| No Dung | 49.1 | 49.8 | 51.5 | 49.1 | 50.2 | 50.9 | 49.9 |
| Dung | 59.2 | 60.8 | 56.9 | 57.1 | 62.3 | 59.5 | 59.0 |
| Mean | 54.1 | 55.3 | 54.2 | 53.1 | 56.3 | 55.2 | 54.4 |

| Tops: tons per acre | | | | | | | |
|---------------------|-------|-------------|-------|-------|-------------|-------|-------|
| | (a) | (b) and (c) | | (a) | (b) and (c) | | |
| Shallow | 9.71 | 9.62 | 10.03 | 9.43 | 10.10 | 10.11 | 9.76 |
| Deep | 11.16 | 11.25 | 10.78 | 11.24 | 10.70 | 11.17 | 11.09 |
| No Dung | 9.81 | 9.68 | 9.68 | 9.98 | 9.32 | 9.71 | 9.75 |
| Dung | 11.05 | 11.19 | 11.13 | 10.69 | 11.48 | 11.56 | 11.11 |
| Mean | 10.43 | 10.44 | 10.41 | 10.34 | 10.40 | 10.64 | 10.43 |

Total Sugar (a) ± 1.32 for use in comparisons other than horizontal.
 (b) ± 2.52 for use in horizontal comparisons.
 (c) ± 2.22 as (a).
 Tops (a) ± 0.399 for use in comparisons other than horizontal.
 (b) ± 0.430 for use in horizontal comparisons.
 (c) ± 0.502 as (a).

Series 5: Sugar Beet

| | Phosphate | | | Potash | | | Mean |
|----------------------------------|-----------|-------------|-------------|--------|-------------|-------------|------|
| | None | Ploughed in | In seed bed | None | Ploughed in | In seed bed | |
| Plant Number: thousands per acre | | | | | | | |
| Shallow | 22.6 | 20.9 | 21.0 | 21.7 | 21.7 | 21.9 | 21.8 |
| Deep | 24.5 | 23.8 | 24.7 | 24.4 | 23.7 | 25.0 | 24.4 |
| No Dung | 23.1 | 21.5 | 23.2 | 23.0 | 21.3 | 23.6 | 22.7 |
| Dung | 24.0 | 23.2 | 22.4 | 23.2 | 24.1 | 23.3 | 23.4 |
| Mean | 23.5 | 22.4 | 22.8 | 23.1 | 22.7 | 23.4 | 23.1 |

| Noxious Nitrogen: mg. per 100 g. | | | | | | | |
|----------------------------------|------|------|------|------|------|------|------|
| Shallow | 26.9 | 28.8 | 32.5 | 28.8 | 27.5 | 30.0 | 28.8 |
| Deep | 28.8 | 30.0 | 25.0 | 28.1 | 28.8 | 27.5 | 28.1 |
| No Dung | 28.1 | 30.0 | 27.5 | 28.1 | 28.8 | 28.8 | 28.4 |
| Dung | 27.5 | 28.8 | 30.0 | 28.8 | 27.5 | 28.8 | 28.4 |
| Mean | 27.8 | 29.4 | 28.8 | 28.4 | 28.1 | 28.8 | 28.4 |

Series 1: Barley

Responses to treatments to previous Sugar Beet

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------|------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |

| Grain: Mean yield 32.7 cwt per acre | | | | | | | | | | |
|-------------------------------------|---------|------|------|---------|------|------|------|------|------|--|
| | (±0.40) | | | (±0.57) | | | | | | |
| Floughing deep-shallow | +1.0 | - | - | +1.3 | +0.7 | +1.6 | +0.4 | +1.5 | +0.5 | |
| Dung | +0.2 | +0.5 | -0.1 | - | - | -0.2 | +0.6 | -1.0 | +1.4 | |
| Phosphate | +1.2 | +1.8 | +0.6 | +0.8 | +1.6 | - | - | +2.4 | 0.0 | |
| Potash | +0.9 | +1.4 | +0.4 | -0.3 | +2.1 | +2.1 | -0.3 | - | - | |

| Straw: Mean yield 47.9 cwt per acre | | | | | | | | | |
|-------------------------------------|------|------|------|------|------|------|------|------|------|
| Floughing deep-shallow | +1.7 | - | - | +1.8 | +1.6 | +0.2 | +3.2 | +2.7 | +0.7 |
| Dung | +5.4 | +5.5 | +5.3 | - | - | +4.4 | +6.4 | +6.3 | +4.5 |
| Phosphate | -0.9 | -2.4 | +0.6 | -1.9 | +0.1 | - | - | -0.4 | -1.4 |
| Potash | +2.2 | +3.2 | +1.2 | +3.1 | +1.3 | +2.7 | +1.7 | - | - |

Series 6: Ley

Responses to treatments to previous Sugar Beet

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-----------------------------------|---------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Hay: Mean yield 56.7 cwt per acre | | | | | | | | | |
| | (±2.59) | | | | | | | | |
| Ploughing deep-shallow | +1.1 | - | - | +5.0 | -2.8 | +4.5 | -2.3 | +3.2 | -1.0 |
| Dung | +10.3 | +14.2 | +6.4 | - | - | +8.8 | +11.8 | +15.3 | +5.3 |
| Phosphate | -1.0 | +2.4 | -4.4 | -2.5 | +0.5 | - | - | -2.7 | +0.7 |
| Potash | +4.0 | +6.1 | +1.9 | +9.0 | -1.0 | +2.3 | +5.7 | - | - |

Series 2: Wheat*

Grain: Mean yield 45.1 cwt per acre

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------------------------------|---------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Grain: Mean yield 45.1 cwt per acre | | | | | | | | | |
| | (±0.35) | | | | | | | | |
| Ploughing deep-shallow | +1.1 | - | - | +1.0 | +1.2 | +2.4 | -0.2 | +1.2 | +1.0 |
| Dung | +0.5 | +0.4 | +0.6 | - | - | +1.2 | -0.2 | 0.0 | +1.0 |
| Phosphate | 0.0 | +1.3 | -1.3 | +0.7 | -0.7 | - | - | +1.0 | -1.0 |
| Potash | +0.8 | +0.9 | +0.7 | +0.3 | +1.3 | +1.8 | -0.2 | - | - |

Straw: Mean yield 67.7 cwt per acre

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------------------------------|------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Straw: Mean yield 67.7 cwt per acre | | | | | | | | | |
| Ploughing deep-shallow | +2.3 | - | - | +3.9 | +0.7 | +3.7 | +0.9 | +2.0 | +2.6 |
| Dung | +6.7 | +8.3 | +5.1 | - | - | +7.3 | +6.1 | +7.5 | +5.9 |
| Phosphate | +1.1 | +2.5 | -0.3 | +1.7 | +0.5 | - | - | +0.4 | +1.8 |
| Potash | +1.1 | +0.8 | +1.4 | +1.9 | +0.3 | +0.4 | +1.8 | - | - |

Series 3: Potatoes

Total tubers: Mean yield 11.27 tons per acre

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|--|----------|-----------|-------|-------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Total tubers: Mean yield 11.27 tons per acre | | | | | | | | | |
| | (±0.851) | | | | | | | | |
| Ploughing deep-shallow | -0.05 | - | - | +0.16 | -0.26 | +0.30 | -0.40 | -0.22 | +0.12 |
| Dung | +5.30 | +5.51 | +5.09 | - | - | +4.40 | +6.20 | +7.39 | +3.21 |
| Phosphate | +1.56 | +1.91 | +1.21 | +0.66 | +2.46 | - | - | +1.32 | +1.80 |
| Potash | +3.24 | +3.07 | +3.41 | +5.33 | +1.15 | +3.00 | +3.48 | - | - |

Percentage Ware (1½" riddle): Mean 81.8

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|---|------|-----------|------|-------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Percentage Ware (1½" riddle): Mean 81.8 | | | | | | | | | |
| Ploughing deep-shallow | 0.0 | - | - | +1.0 | -1.0 | 0.0 | 0.0 | -1.5 | +1.5 |
| Dung | +6.7 | +7.7 | +5.7 | - | - | +1.5 | +11.9 | +12.4 | +1.0 |
| Phosphate | -1.1 | -1.1 | -1.1 | -6.3 | +4.1 | - | - | -2.7 | +0.5 |
| Potash | +7.4 | +5.9 | +8.9 | +13.1 | +1.7 | +5.8 | +9.0 | - | - |

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

53/Bb/1.7

Series 3: Potatoes

| | Phosphate | | | Potash | | | Mean |
|------------------------------|-----------|-------------|-----------|--------|-------------|-----------|-------|
| | None | Ploughed in | In ridges | None | Ploughed in | In ridges | |
| Total Tubers: tons per acre | | | | | | | |
| | (a) | (b) and (c) | | (a) | (b) and (c) | | |
| Shallow | 10.34 | 12.04 | 12.45 | 9.76 | 12.17 | 13.49 | 11.29 |
| Deep | 10.64 | 11.90 | 11.79 | 9.53 | 12.47 | 13.42 | 11.24 |
| No Dung | 8.29 | 8.69 | 9.20 | 5.95 | 10.60 | 11.96 | 8.62 |
| Dung | 12.69 | 15.25 | 15.04 | 13.34 | 14.04 | 14.95 | 13.92 |
| Mean | 10.49 | 11.97 | 12.12 | 9.65 | 12.32 | 13.46 | 11.27 |
| Percentage Ware (1½" riddle) | | | | | | | |
| Shallow | 82.3 | 81.8 | 80.7 | 78.8 | 83.8 | 85.7 | 81.8 |
| Deep | 82.4 | 84.8 | 77.8 | 77.4 | 85.0 | 87.6 | 81.8 |
| No Dung | 81.6 | 78.8 | 71.9 | 71.9 | 83.4 | 86.6 | 78.4 |
| Dung | 83.1 | 87.8 | 86.6 | 84.3 | 85.4 | 86.8 | 85.2 |
| Mean | 82.3 | 83.3 | 79.3 | 78.1 | 84.4 | 86.6 | 81.8 |

Total tubers (a) ± 0.851 for use in comparisons other than horizontal.
 (b) ± 0.260 for use in horizontal comparisons.
 (c) ± 0.871 as (a).

Series 4: Spring Oats

Responses to treatments to previous potatoes.

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------------------------------|----------------|----------------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Grain: Mean yield 26.0 cwt per acre | | | | | | | | | |
| Ploughing | (± 0.94) | (± 1.33) | | | | | | | |
| deep-shallow | -3.2 | - | - | -1.7 | -1.7 | -2.2 | -1.2 | -2.1 | -4.3 |
| Dung | +1.0 | +2.5 | -0.5 | - | - | -0.1 | +2.1 | +0.3 | +1.7 |
| Phosphate | +2.4 | +3.4 | +1.4 | +1.3 | +3.5 | - | - | +0.2 | +4.6 |
| Potash | -0.5 | +0.6 | -1.6 | -1.2 | +0.2 | -2.7 | +1.7 | - | - |
| Straw: Mean yield 38.1 cwt per acre | | | | | | | | | |
| Ploughing | -1.3 | - | - | -2.5 | -1.1 | -0.3 | -2.8 | -0.9 | -2.7 |
| deep-shallow | | | | | | | | | |
| Dung | +2.8 | +2.1 | +3.5 | - | - | +1.2 | +4.4 | +2.6 | +3.0 |
| Phosphate | +1.4 | +2.4 | +0.4 | -0.2 | +3.0 | - | - | -0.6 | +3.4 |
| Potash | -0.3 | +0.6 | -1.2 | -0.5 | -0.1 | -2.3 | +1.7 | - | - |