

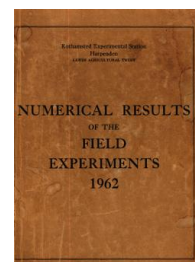
Thank you for using eradoc, a platform to publish electronic copies of the Rothamsted Documents. Your requested document has been scanned from original documents. If you find this document is not readable, or you suspect there are some problems, please let us know and we will correct that.



ROTHAMSTED
RESEARCH

Yields of the Field Experiments 1962

[Full Table of Content](#)



62/W/B/4 Ley and Arable Rotations

Rothamsted Research

Rothamsted Research (1963) *62/W/B/4 Ley and Arable Rotations* ; Yields Of The Field Experiments 1962, pp 63 - 73 - DOI: <https://doi.org/10.23637/ERADOC-1-164>

62/B/4.1

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1962 - the 25th year.

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

Corrective K dressings (in cwt K_2O per acre, applied to sugar beet as muriate of potash half in autumn before ploughing and half broadcast on the plough furrow in February - commencing autumn 1961):-

Continuous rotations

| <u>Rotation</u> | Fertiliser plots | Dung plots |
|-----------------|------------------|------------|
| Arable | 3.6 | 3.2 |
| Arable with hay | 3.6 | 3.2 |
| Lucerne | 3.6 | 3.2 |
| Grazed ley | 1.3 | 0.0 |

Alternating rotations

| <u>Last two rotations in order</u> | Fertiliser plots | Dung plots |
|------------------------------------|------------------|------------|
| Arable with hay/Ley | 2.9 | 2.3 |
| Ley/Arable with hay | 3.6 | 3.2 |
| Lucerne/Arable | 3.6 | 3.2 |
| Arable/Lucerne | 3.6 | 3.2 |

Revised PK basal dressings (in cwt P_2O_5 and K_2O per acre, for all crops, commencing 1962):-

Treatment crops:

| | Fertilisers* and time of application | P_2O_5 | K_2O |
|-------------|---|----------|--------|
| Potatoes. | Superphosphate and muriate of potash, before ridging. | 0.9 | 1.8 |
| Rye. | 0/14/28, combine drilled. | 0.3 | 0.6 |
| Carrots. | Superphosphate and muriate of potash, in seedbed. | 0.6 | 1.8 |
| Hay. | 0/14/28, in spring, plus muriate of potash, after first cut. | 0.6 | 1.2 |
| Lucerne. | | | |
| 1st year | Superphosphate and muriate of potash, in seedbed. | 1.5 | 1.0 |
| 2nd year | Muriate of potash, in spring. | - | 1.5 |
| 3rd year | Muriate of potash, in spring. | - | 1.5 |
| Grazed ley. | | | |
| 1st year | Superphosphate and muriate of potash, in seedbed | 1.5 | 1.0 |
| 2nd year | 16/0/16, $\frac{1}{3}$ in spring, $\frac{1}{3}$ in early summer, $\frac{1}{3}$ in late summer | - | 0.55 |
| 3rd year | as second year | - | 0.55 |

*Granular compound fertilisers are described thus - 0/14/28 etc. to show percentages of N, P_2O_5 and K_2O in order.

62/B/4.2

Test crops:-

| | Fertilisers and time of application | P ₂ O ₅ | K ₂ O |
|------------------|--|-------------------------------|------------------|
| Sugar beet | | | |
| Fertiliser plots | Muriate of potash ploughed in, superphosphate on plough furrow | 0.9 | 3.0 ⁺ |
| Dung plots | superphosphate and muriate of potash on plough furrow | 0.3 | 0.9 |
| Barley | Superphosphate in winter | 0.3 | - |

⁺Basal K₂O to sugar beet fertiliser plots to be equivalent to K₂O applied in dung in future.

Sub-plot fertiliser tests (in addition to basals) in cwt per acre:-

Sugar beet

All combinations of:-

'Nitro-Chalk': None; 0.72 N Magnesium sulphate: None;

Muriate of potash: None; 0.9 K₂O 500 lb per acre

Muriate of potash at 0.9 K₂O is applied in winter for barley to the sub-plots which did not receive the "test" potash for sugar beet.

Barley variety: This is now Proctor, and not Herta as hitherto.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 15 and Dec 22, 1961. Seedbed fertilisers applied: Mar 28, 1962. Seed sown at 40 lb per acre: Apr 10. Sprayed with MCPB/MCPA at 4 pints in 40 gallons per acre: May 30. 'Nitro-Chalk' applied: July 19 and Aug 16. Grazed 4 circuits: July 17 - Oct 8.

Ley 2nd year. Compound fertiliser applied: Mar 29, June 18, Aug 16, 1962. Grazed 5 circuits: May 15 - Sept 22.

Ley 3rd year. Compound fertiliser applied: Mar 29, June 20, Aug 16, 1962. Grazed 5 circuits: May 23 - Sept 30.

Lucerne 1st year. Ploughed: Aug 15, 1961. Treated for control of stem eelworm by injection of "D.D" soil fumigant at 800 lb per acre: Oct 31. Ploughed: Dec 22. Fertilisers applied: Mar 28, 1962. Seed drilled at 15 lb per acre: Apr 13. Cut twice: Aug 14 and Oct 1.

Lucerne 2nd year. Muriate of potash applied: Mar 29, 1962. Cut 3 times: June 27, Aug 14, Oct 1.

Lucerne 3rd year. Muriate of potash applied: Mar 29, 1962. Cut 3 times: June 27, Aug 14, Oct 1.

Arable rotations

Potatoes. Ploughed twice: Aug 15 and Dec 22, 1961. Fertilisers applied, potatoes machine planted: Mar 16, 1962. Earthed up: June 15. Sprayed twice with copper oxychloride fungicide at 2.3 lb Cu in 40 gallons per acre: July 23 and Aug 9. Haulm burnt off with diquat at 3 pints in 40 gallons per acre: Sept 22. Lifted: Oct 3.

62/B/4.3

Rye. Ploughed: Sept 23, 1961. Seed combine drilled at $2\frac{1}{2}$ bushels per acre with PK compound: Oct 10. 'Nitro-Chalk' applied: Mar 30, 1962. Seeds hay mixture undersown on 4 plots: Apr 10. Combine harvested: Aug 31.
 Seeds hay. Seeds undersown at 30 lb per acre in rye: Apr 11, 1961. PK compound and 'Nitro-Chalk' applied: Mar 29, 1962. Cut once: June 13. Muriate of potash and 'Nitro-Chalk' applied: June 14.
 Carrots. Ploughed twice: Sept 4 and Dec 22, 1961. Fertilisers applied: Apr 24, 1962. Seed drilled at $4\frac{1}{2}$ lb per acre: Apr 27. Sprayed twice with demeton methyl at 12 fluid oz in 40 gallons per acre: May 29 and June 23. Thinned: June 29 - July 6. Lifted: Sept 19.

Test crops

Sugar beet. Dung equivalent K and half corrective K applied: Oct 23, 1961. Dung applied, all plots ploughed: Oct 25. Half corrective K, basal superphosphate and muriate of potash applied: Feb 22, 1962. 'Nitro-Chalk', "test" muriate of potash and magnesium sulphate applied, seed drilled at 7 lb per acre: Mar 21. Singled: May 30. Lifted: Sept 24.
 Barley. Ground chalk applied at 40 cwt per acre: Nov 3, 1961. Ploughed: Nov 4. "Balancing" muriate of potash and basal superphosphate applied: Feb 19, 1962. Seed drilled at $2\frac{1}{2}$ bushels per acre: Feb 20. 'Nitro-Chalk' applied: Feb 23. Plots re-drilled at 1 bushel per acre (because of bird damage): Mar 21. Combine harvested: Aug 25.

Standard errors per plot. Test crops.

| | | |
|----------------------------|----------------------|--|
| Sugar beet. Roots (washed) | Whole plot: | 1.112 tons per acre or 7.7% (4 d.f.) |
| | $\frac{1}{2}$ plot: | 0.590 tons per acre or 4.1% (4 d.f.) |
| | $\frac{1}{8}$ plot: | 0.987 tons per acre or 6.9% (24 d.f.) |
| | $\frac{1}{16}$ plot: | 0.900 tons per acre or 6.3% (32 d.f.) |
| Total sugar | Whole plot: | 4.27 cwt per acre or 9.2% (4 d.f.) |
| | $\frac{1}{2}$ plot: | 1.81 cwt per acre or 3.9% (4 d.f.) |
| | $\frac{1}{8}$ plot: | 3.39 cwt per acre or 7.3% (24 d.f.) |
| | $\frac{1}{16}$ plot: | 3.06 cwt per acre or 6.6% (32 d.f.) |
| Tops | Whole plot: | 0.615 tons per acre or 2.7% (4 d.f.) |
| | $\frac{1}{2}$ plot: | 1.484 tons per acre or 6.4% (4 d.f.) |
| | $\frac{1}{8}$ plot: | 1.290 tons per acre or 5.6% (24 d.f.) |
| | $\frac{1}{16}$ plot: | 2.225 tons per acre or 9.6% (32 d.f.) |

62/B/4.4

Standard errors per plot. Test crops.

| | | |
|---------|------------------------------|---|
| Barley. | Grain (at 85% dry matter) | Whole plot: 1.10 cwt per acre or 2.6% (4 d.f.) |
| | | $\frac{1}{2}$ plot: 1.58 cwt per acre or 3.7% (4 d.f.) |

62/B/4.5

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

| 1st year | 2nd year | 3rd year |
|----------|----------|----------|
| 1265 | 1211 | 1397 |

Lucerne, dry matter: cwt per acre

| | 1st cut | 2nd cut | 3rd cut | Total |
|-----------------------------|---------|---------|---------|-------|
| <u>1st year</u> | | | | |
| Dung in 1960: tons per acre | | | | |
| None | 9.0 | 10.0 | | 19.0 |
| 15 | 12.8 | 13.0 | | 25.8 |
| Difference | +3.8 | +3.0 | | +6.8 |
| Previous rotation | | | | |
| Lucerne | 8.4 | 9.0 | | 17.4 |
| Arable with hay | 13.2 | 14.0 | | 27.2 |
| Mean | 10.8 | 11.5 | | 22.3 |
| <u>2nd year</u> | | | | |
| Dung in 1959: tons per acre | | | | |
| None | 17.3 | 16.3 | 14.7 | 48.3 |
| 15 | 26.8 | 18.3 | 16.4 | 61.5 |
| Difference | +9.5 | +2.0 | +1.7 | +13.2 |
| Previous rotation | | | | |
| Lucerne | 19.8 | 18.9 | 14.7 | 53.4 |
| Arable with roots | 24.2 | 15.7 | 16.4 | 56.3 |
| Mean | 22.0 | 17.3 | 15.6 | 54.8 |
| <u>3rd year</u> | | | | |
| Dung in 1958: tons per acre | | | | |
| None | 13.6 | 10.6 | 7.3 | 31.5 |
| 15 | 22.4 | 12.2 | 5.8 | 40.4 |
| Difference | +8.8 | +1.6 | -1.5 | +8.9 |
| Previous rotation | | | | |
| Lucerne | 15.2 | 10.6 | 5.9 | 31.7 |
| Arable with hay | 20.8 | 12.2 | 7.2 | 40.2 |
| Mean | 18.0 | 11.4 | 6.6 | 36.0 |

62/B/4.6

| | <u>Treatment crops</u> | | Rye | |
|---------------------|--------------------------------|--|-------------------------------|-------------------------------|
| | Potatoes | | Grain: | Straw: |
| | Total tubers: tons per acre | Percentage ware ($1\frac{5}{8}$ " riddle) | (at 85% D.M.) cwt per acre | (at 85% D.M.) cwt per acre |
| Dung: tons per acre | | | | |
| None | 9.45 | 94.8 | 36.7 | 44.2 |
| 15* | 11.86 | 94.8 | 34.8 | 45.3 |
| Difference | +2.41 | 0.0 | -1.9 | +1.1 |
| Previous rotation | | | | |
| Ley | 12.84 | 95.2 | 35.3 | 45.0 |
| Lucerne | 10.84 | 95.2 | 40.0 | 52.5 |
| Arable with hay | 10.64 | 94.7 | 31.1 | 36.3 |
| Arable with roots | 8.32 | 94.0 | 36.4 | 45.2 |
| Mean | 10.66 | 94.8 | 35.7 | 44.7 |

| | <u>Hay</u> | |
|-----------------------------|--|------|
| | <u>Yield, dry matter: cwt per acre</u> | |
| | 1st and only cut | |
| Dung in 1958: tons per acre | | |
| None | | 52.5 |
| 15 | | 55.5 |
| Difference | | +3.0 |
| Previous rotation | | |
| Lucerne | | 54.6 |
| Arable with hay | | 53.4 |
| Mean | | 54.0 |

| | <u>Carrots</u> | |
|-----------------------------|--------------------------------|------------------------|
| | Roots washed: tons per acre | Tops: tons per acre |
| Dung in 1958: tons per acre | | |
| None | 14.58 | 7.67 |
| 15 | 15.86 | 8.36 |
| Difference | 1.28 | 0.69 |
| Previous rotation | | |
| Ley | 16.37 | 8.10 |
| Arable with roots | 14.07 | 7.94 |
| Mean | 15.22 | 8.02 |

*Dung applied: Potatoes for test crop sugar beet in 1960.
Rye for test crop sugar beet in 1959.

Mean dry matter % as harvested: Rye, Grain: 82.0
Straw: 76.8

62/B/4.7

| | | 1st Test crop | | | | Mean |
|--|-----------|--------------------------------------|----------|-----------------|-------------------|----------|
| | | Sugar beet | | | | |
| | | Previous rotation | | | | |
| | | Ley | Lucerne | Arable with hay | Arable with roots | |
| | | <u>Roots (washed): tons per acre</u> | | | | |
| Mean | (±1.112) | 14.45 | 14.54 | 14.09 | 14.45 | 14.39 |
| Dung: tons per acre | | | | | | |
| None | (±1.188)* | 13.68 | 13.73 | 13.32 | 13.45 | 13.55 |
| 15 | | 15.22 | 15.35 | 14.87 | 15.45 | 15.22 |
| Difference | (±0.834) | +1.54 | +1.62 | +1.55 | +2.00 | +1.67 |
| Response to additional 0.72 cwt N per acre | | | | | | |
| | | | (±0.987) | | | (±0.494) |
| No dung | | -0.54 | -0.78 | +1.36 | +0.15 | +0.05 |
| Dung 15 tons per acre | | -0.03 | +0.29 | +0.30 | +0.22 | +0.19 |
| Response to additional 0.9 cwt K ₂ O per acre | | | | | | |
| | | | (±0.987) | | | (±0.494) |
| No dung | | +0.18 | +1.32 | +0.58 | -0.38 | +0.43 |
| Dung 15 tons per acre | | +1.47 | -0.01 | -0.38 | -0.16 | +0.23 |
| | | <u>Sugar Percentage</u> | | | | |
| Mean | | 15.7 | 15.8 | 16.6 | 16.3 | 16.1 |
| Dung: tons per acre | | | | | | |
| None | | 15.9 | 15.9 | 17.0 | 16.8 | 16.4 |
| 15 | | 15.5 | 15.7 | 16.2 | 15.8 | 15.8 |
| Difference | | -0.4 | -0.2 | -0.8 | -1.0 | -0.6 |
| Response to additional 0.72 cwt N per acre | | | | | | |
| No dung | | -1.1 | -0.2 | -0.8 | -0.7 | -0.7 |
| Dung 15 tons per acre | | -0.7 | -0.7 | -1.0 | -0.7 | -0.8 |
| Response to additional 0.9 cwt K ₂ O per acre | | | | | | |
| No dung | | 0.0 | +0.6 | -0.4 | -0.2 | 0.0 |
| Dung 15 tons per acre | | -0.2 | +0.1 | +0.1 | -0.1 | 0.0 |

*For use in horizontal and diagonal comparisons only.

62/B/4.8

| | | 1st Test Crop | | | | Mean |
|--|-----------|----------------------------------|----------|-----------------|-------------------|----------|
| | | Sugar beet | | | | |
| | | Previous rotation | | | | |
| | | Ley | Lucerne | Arable with hay | Arable with roots | |
| | | <u>Total sugar: cwt per acre</u> | | | | |
| Mean | (±4.27) | 45.4 | 45.8 | 46.7 | 46.9 | 46.2 |
| Dung: tons per acre | | | | | | |
| None | (±4.46)* | 43.6 | 43.6 | 45.2 | 45.2 | 44.4 |
| 15 | | 47.2 | 48.0 | 48.2 | 48.7 | 48.0 |
| Difference | (±2.56) | +3.6 | +4.4 | +3.0 | +3.5 | +3.6 |
| Response to additional 0.72 cwt N per acre | | | (±3.39) | | | (±1.70) |
| No dung | | -4.7 | -2.9 | +2.5 | -1.4 | -1.7 |
| Dung 15 tons per acre | | -2.1 | -1.2 | -1.9 | -1.6 | -1.7 |
| Response to additional 0.9 cwt K ₂ O per acre | | | (±3.39) | | | (±1.70) |
| No dung | | +0.5 | +5.9 | +1.0 | -2.0 | +1.4 |
| Dung 15 tons per acre | | +4.1 | +0.2 | -1.0 | -0.7 | +0.7 |
| | | <u>Tops: tons per acre</u> | | | | |
| Mean | (±0.615) | 23.96 | 23.82 | 22.16 | 22.64 | 23.15 |
| Dung: tons per acre | | | | | | |
| None | (±1.216)* | 22.60 | 22.40 | 19.30 | 21.14 | 21.36 |
| 15 | | 25.33 | 25.24 | 25.02 | 24.14 | 24.93 |
| Difference | (±2.098) | +2.73 | +2.84 | +5.99 | +3.00 | +3.57 |
| Response to additional 0.72 cwt N per acre | | | (±1.290) | | | (±0.645) |
| No dung | | +4.20 | +1.61 | +5.46 | +5.22 | +4.12 |
| Dung 15 tons per acre | | +0.55 | +3.42 | +2.44 | +3.02 | +2.36 |
| Response to additional 0.9 cwt K ₂ O per acre | | | (±1.290) | | | (±0.645) |
| No dung | | +2.50 | +1.29 | -0.05 | +0.32 | +1.02 |
| Dung 15 tons per acre | | +3.10 | +1.33 | -0.32 | +0.41 | +1.13 |

*For use in horizontal and diagonal comparisons only.

62/B/4.9

1st Test Crop

Sugar beet

Plots receiving no additional N or K

| Dung: tons per acre | | Previous rotation | | | Mean | |
|--------------------------------------|-----------|-------------------|---------|-----------------|-------|-------------------|
| | | Ley | Lucerne | Arable with hay | | Arable with roots |
| <u>Roots (washed): tons per acre</u> | | | | | | |
| Mean | (±1.035) | 14.29 | 14.38 | 14.14 | 14.52 | 14.33 |
| None | (±1.380)* | 14.26 | 13.94 | 12.75 | 13.50 | 13.61 |
| 15 | | 14.33 | 14.82 | 15.53 | 15.54 | 15.05 |
| Difference | (±1.469) | +0.07 | +0.88 | +2.78 | +2.04 | +1.44 |
| <u>Sugar percentage</u> | | | | | | |
| Mean | | 16.2 | 15.8 | 17.0 | 16.7 | 16.4 |
| None | | 16.7 | 15.6 | 17.7 | 17.1 | 16.8 |
| 15 | | 15.7 | 16.0 | 16.2 | 16.3 | 16.1 |
| Difference | | -1.0 | +0.4 | -1.5 | -0.8 | -0.7 |
| <u>Total sugar: cwt per acre</u> | | | | | | |
| Mean | (±3.78) | 46.4 | 45.4 | 47.7 | 48.4 | 47.0 |
| None | (±5.03)* | 47.8 | 43.5 | 45.1 | 46.1 | 45.6 |
| 15 | | 45.1 | 47.3 | 50.3 | 50.6 | 48.3 |
| Difference | (±4.88) | -2.7 | +3.8 | +5.2 | +4.5 | +2.7 |
| <u>Tops: tons per acre</u> | | | | | | |
| Mean | (±1.167) | 21.40 | 21.78 | 20.93 | 20.20 | 21.08 |
| None | (±1.557)* | 18.94 | 21.11 | 17.17 | 18.62 | 18.96 |
| 15 | | 23.86 | 22.46 | 24.69 | 21.78 | 23.20 |
| Difference | (±2.626) | +4.92 | +1.35 | +7.52 | +3.16 | +4.24 |

*For use in horizontal and diagonal comparisons only.

62/B/4.10

1st Test Crop

Sugar beet

Previous rotation

| Magnesium sulphate: lb per acre | Previous rotation | | | | Mean |
|--------------------------------------|-------------------|---------|-----------------------|-------------------------|-------------------|
| | Ley | Lucerne | Arable with hay | Arable with roots | |
| <u>Roots (washed): tons per acre</u> | | | | | |
| (±0.840)* | | | | | |
| None | 14.28 | 14.47 | 14.01 | 14.44 | 14.30 |
| 500 | 14.63 | 14.61 | 14.18 | 14.46 | 14.47 |
| Difference (±0.318) | +0.35 | +0.14 | +0.17 | +0.02 | +0.17 (±0.159) |
| <u>Sugar percentage</u> | | | | | |
| None | 15.7 | 15.8 | 16.6 | 16.4 | 16.1 |
| 500 | 15.6 | 15.7 | 16.6 | 16.2 | 16.1 |
| Difference | -0.1 | -0.1 | 0.0 | -0.2 | 0.0 |
| <u>Total sugar: cwt per acre</u> | | | | | |
| (±3.14)* | | | | | |
| None | 45.1 | 45.6 | 46.4 | 47.1 | 46.0 |
| 500 | 45.8 | 46.0 | 47.0 | 46.8 | 46.4 |
| Difference (±1.08) | +0.7 | +0.4 | +0.6 | -0.3 | +0.4 (±0.54) |
| <u>Tops: tons per acre</u> | | | | | |
| (±0.860)* | | | | | |
| None | 24.16 | 23.93 | 22.55 | 22.54 | 23.29 |
| 500 | 23.77 | 23.72 | 21.77 | 22.74 | 23.00 |
| Difference (±0.787) | -0.39 | -0.21 | -0.78 | +0.20 | -0.29 (±0.393) |

* for use in horizontal and diagonal comparisons only.

62/B/4.11

2nd Test Crop

Barley

Previous rotation

| Dung in 1961: tons per acre | | Previous rotation | | | | Mean |
|--|----------|-------------------|---------|-----------------------|-------------------------|-----------------|
| | | Ley | Lucerne | Arable with hay | Arable with roots | |
| <u>Grain (at 85% dry matter): cwt per acre</u> | | | | | | |
| None | (±1.11)* | 43.5 | 41.2 | 40.0 | 40.0 | 41.2 |
| 15 | | 42.7 | 43.4 | 44.9 | 43.9 | 43.7 |
| Mean | (±0.77) | 43.1 | 42.3 | 42.4 | 42.0 | 42.4 |
| Difference | (±1.58) | -0.8 | +2.2 | +4.9 | +3.9 | +2.5 (±0.79) |

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

| | | | | | | |
|------------|--|------|------|------|------|------|
| None | | 31.8 | 28.9 | 23.7 | 29.2 | 28.4 |
| 15 | | 35.6 | 36.2 | 32.0 | 32.3 | 34.0 |
| Mean | | 33.7 | 32.5 | 27.8 | 30.7 | 31.1 |
| Difference | | +3.8 | +7.3 | +8.3 | +3.1 | +5.6 |

* For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 80.0
Straw 85.0