ROTHAMSTED RESEARCH

# Yields of the Field Experiments 1965

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## 65/W/WLA/B/4 Ley and Arable Rotations

### Rothamsted Research

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65/B/4.1

# LEY AND ARABLE ROTATIONS

(WIA)

Woburn Stackyard 1965 - the 28th year.

For history, treatments etc., see 'Details' 1962.

Sugar Beet: Fertilisers are now as follows:-

Test fertilisers: All combinations of:-

1. Nitrogen: Ley and lucerne rotations: 0.35, 0.70, 1.05, 1.40 cwt N.
   Arable with roots rotation: 0.70, 1.05, 1.40, 1.75 cwt N.
   Arable with hay rotation: 1.05, 1.40, 1.75, 2.10 cwt N.
   All N as 'Nitro-Chalk'.
2. Potash: 0.0, 0.9 cwt $K_2O$ as muriate of potash.

Basal fertilisers: 2.0 cwt $P_2O_5$ as superphosphate, 0.9 cwt $K_2O$ as muriate of potash and magnesium sulphate at 500 lb $MgSO_4$ $7H_2O$.

Corrective K dressings (in cwt $K_2O$) as muriate of potash:

| Continuous rotations | No dung plots | Dung plots |
|---|---|---|
| Rotation | | |
| Arable | 3 | 2 |
| Arable with hay | 4 | 3 |
| Lucerne | 3 | 3 |
| Grazed ley | 0 | 0 |
| Alternating rotations | | |
| Last 2 rotations in order | | |
| Arable/ley | 3 | 1 |
| Lucerne/arable with hay | 3 | 3 |
| Arable with hay/lucerne | 3 | 3 |
| Ley/arable | 3 | 2 |

K equivalent of dung: In 1965 plots not receiving dung received 3.7 cwt $K_2O$ as muriate of potash, the K equivalent of the dung used.

The 1962 dressing was omitted from the 'Results' for that year and was 3.0 cwt $K_2O$.

Sainfoin: The third-year lucerne failed and was replaced by sainfoin, which received a basal dressing of 0.5 cwt N as 'Nitro-Chalk', 0.5 cwt $P_2O_5$ as superphosphate and 1.5 cwt $K_2O$ as muriate of potash. The second-year sainfoin failed and was resown with a basal fertiliser in the seedbed of 0.5 cwt $P_2O_5$ and 0.5 cwt $K_2O$ as (0:20:20). The potatoes were lifted early because of damage by eelworm (Heterodera rostochiensis).

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Cultivations, etc.:
Treatment crops.

Ley 1st year: Ploughed: Aug 24, 1964. Seedbed fertilisers applied and seed sown: Apr 1, 1965. Compound fertiliser applied: June 16, Sept 9 - 21. Grazed 8 circuits: June 2 - Nov 7.

Ley 2nd year: Compound fertiliser applied: Mar 19, June 2, Sept 1. Grazed 10 circuits: Apr 22 - Nov 3.

Ley 3rd year: Compound fertiliser applied: Mar 19, June 22, Aug 23. Grazed 9 circuits: Apr 30 - Oct 26.

Sainfoin 1st year: Ploughed: Aug 24, 1964. Fertilisers applied: Apr 5, 1965. Seed drilled at 60 lb: Apr 7. Cut twice: Aug 11, Oct 20.

Sainfoin 2nd year: NK fertiliser applied: Mar 19, 1965. Cut twice: May 31, Aug 4. Sprayed with paraquat at 0.5 lb ion in 40 gals: Aug 12. Rotary cultivated: Aug 16. Basal PK applied: Aug 18. Re-drilled at 56 lb: Aug 19.

Sainfoin 3rd year: Ploughed: Nov 9, 1964. Fertilisers applied: Apr 5, 1965. Seed drilled at 60 lb: Apr 7. Cut twice: Aug 11, Oct 20.

Arable rotations.

Potatoes: Ploughed: Aug 24, 1964. Fertilisers applied, plots rotary cultivated: Apr 6, 1965. Potatoes machine planted: Apr 7. Earthed up: June 14. Sprayed with mancozeb at 1.2 lb in 37 gals: July 5, July 16 and Aug 4. Sprayed with diquat (Reglone at 4 pints in 40 gals): Aug 12. Lifted: Aug 31.

Rye: Ploughed: Sept 29 - Oct 21, 1964. Seed combine drilled at 150 lb: Oct 22. 'Nitro-Chalk' applied: Mar 31, 1965. Combine harvested: Sept 14.

Seeds hay: Seeds undersown in rye at 30 lb: Apr 8, 1964. 'Nitro-Chalk' and PK compound applied: Mar 19, 1965. NK fertiliser applied: June 2. Cut twice: May 31, Aug 5.

Carrots: Ploughed: Sept 29, 1964. Fertilisers applied: Apr 8, 1965. Rotary cultivated, seed drilled at 3.5 lb: Apr 13. Sprayed with menazon (Saphicol at 0.5 pints in 40 gals): June 2, June 21. Lifted: Aug 27.

Test crops.

Sugar beet: Dung equivalent K and half corrective K (including all corrective K for plot 8 - arable/ley with dung applied: Nov 23, 1964. Dung applied: Nov 24. All plots ploughed: Nov 25. Part of basal superphosphate applied, basal muriate of potash and second half of corrective K applied: Feb 2, 1965. Remaining basal superphosphate applied, magnesium

sulphate applied: Apr 1. Test 'Nitro-Chalk' and muriate of potash applied: Apr 2. Seed drilled at 5 lb: Apr 3. Singled: May 19. Lifted: Oct 26.

Barley: Ground chalk applied at 40 cwt: Nov 13, 1964. Ploughed: Nov 16. Balancing muriate of potash and basal superphosphate applied: Feb 16. 'Nitro-Chalk' applied: Feb 18. Seed drilled at 155 lb: Mar 12. Spring-tine cultivated and re-drilled at 140 lb because of bird damage: Apr 8. Sprayed with mecoprop/2,4-D (Methoxone Extra at 6 pints in 40 gals): May 11. Combine harvested: Sept 1.

Standard errors per plot.

| | | | |
|---|---|---|---|
| Sugar beet 1/8 plot: | | | |
| Roots: | 2.146 | or 10.6% | (21 d.f.) |
| Total sugar: | 6.97 | or 9.9% | (21 d.f.) |
| Tops: | 2.081 | or 12.1% | (21 d.f.) |
| Barley grain: | | | |
| Whole plot: | 1.71 | or 4.1% | (4 d.f.) |
| 1/2 plot: | 0.80 | or 1.9% | (4 d.f.) |

Errata to 'Results' 1963 and 1964

| | | |
|---|---|---|
| p. 63/B/4.4 | Lucerne 1st year | year dung applied should read 1961 not 1958 |
| p. 64/B/4.4 | Sanfoin 1st year | year dung applied should read 1962 not 1959 |
| | Lucerne 2nd year | year dung applied should read 1961 not 1958 |

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## SUMMARY OF RESULTS

### TREATMENT CROPS

### LEY, SHEEP DAYS OF GRAZING

| 1st year | 2nd year | 3rd year |
|---|---|---|
| 2168 | 3541 | 2915 |

### SAINFOIN, DRY MATTER

| | 1st cut | 2nd cut | Total |
|---|---|---|---|
| **1ST YEAR** | | | |
| Dung in 1963 | | | |
| D0 | 24.6 | 7.4 | 32.0 |
| D1 | 25.4 | 8.2 | 33.6 |
| Lu | 24.6 | 6.8 | 31.4 |
| AH | 25.4 | 8.6 | 34.0 |
| Mean | 25.0 | 7.7 | 32.7 |
| **2ND YEAR** | | | |
| Dung in 1962 | | | |
| D0 | 43.8 | 5.0 | 48.8 |
| D1 | 43.0 | 4.2 | 47.2 |
| Lu | 42.4 | 4.2 | 46.6 |
| AH | 44.4 | 5.0 | 49.4 |
| Mean | 43.4 | 4.6 | 48.0 |

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## SAINFOIN, DRY MATTER

| | 1st cut | 2nd cut | Total |
|---|---|---|---|
| 3RD YEAR (resown Spring 1965) | | | |
| Dung in 1961 | | | |
| D0 | 26.7 | 4.3 | 31.0 |
| D1 | 31.9 | 5.6 | 37.5 |
| Lu | 29.2 | 3.2 | 32.4 |
| AH | 29.4 | 6.8 | 36.2 |
| Mean | 29.3 | 5.0 | 34.3 |

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## TREATMENT CROPS

| | POTATOES | | RYE | |
|---|---|---|---|---|
| | TOTAL TUBERS | % WARE | GRAIN | STRAW |
| D0 | 9.44 | 82.0 | 35.0 | 44.3 |
| D1* | 10.89 | 87.6 | 32.8 | 46.8 |
| Ley | 17.07 | 95.6 | 36.4 | 43.6 |
| Lu | 14.40 | 95.4 | 35.0 | 46.9 |
| AH | 4.05 | 69.6 | 29.8 | 48.7 |
| AR | 5.14 | 78.8 | 34.4 | 43.0 |
| Mean | 10.16 | 84.8 | 33.9 | 45.6 |

## HAY

### YIELD, DRY MATTER

| | 1st cut | 2nd cut | Total |
|---|---|---|---|
| 1961 | | | |
| D0 | 57.6 | 39.0 | 96.6 |
| D1 | 61.8 | 37.8 | 99.6 |
| Ley | 60.6 | 39.6 | 100.2 |
| AH | 58.8 | 37.2 | 96.0 |
| Mean | 59.7 | 38.4 | 98.1 |

* Dung applied: Potatoes for test crop sugar beet in 1963
Rye for test crop sugar beet in 1962

Mean D.M. %: Rye, grain: 68.4
straw: 72.6

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CARROTS

| | Roots | Tops |
|---|---|---|
| 1961 | | |
| D0 | 30.96 | 13.31 |
| D1 | 30.86 | 13.12 |
| Lu | 32.00 | 13.50 |
| AR | 29.82 | 12.93 |
| Mean | 30.91 | 13.22 |

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65/B/4.8

1ST TEST CROP

SUGAR BEET

ROOTS

| | N1 | N2 | N3 | N4 | N5 | N6 |
|---|---|---|---|---|---|---|
| | | | (1) | | | |
| D0 Ley | 17.37 | 19.13 | 20.03 | 19.56 | - | - |
| D0 Lu | 19.66 | 21.85 | 20.76 | 21.94 | - | - |
| D0 AH | - | - | 17.10 | 18.52 | 19.50 | 19.61 |
| D0 AR | - | 17.19 | 19.27 | 20.48 | 20.87 | - |
| D1 Ley | 20.13 | 18.56 | 21.36 | 17.97 | - | - |
| D1 Lu | 22.79 | 22.78 | 22.85 | 24.03 | - | - |
| D1 AH | - | - | 19.11 | 21.11 | 20.97 | 20.36 |
| D1 AR | - | 18.53 | 21.76 | 21.50 | 21.99 | - |

| | Ley | Lu | AH | AR | Mean |
|---|---|---|---|---|---|
| CON | 18.69 | 22.12 | 19.95 | 19.32 | 20.02 |
| ALT | 19.84 | 22.05 | 19.13 | 21.08 | 20.52 |
| | | | (2) | | |
| D0 K0 | 18.35 | 21.69 | 18.22 | 19.12 | 19.35 |
| D0 K1 | 19.69 | 20.42 | 19.15 | 19.79 | 19.76 |
| D1 K0 | 19.92 | 22.05 | 20.00 | 21.77 | 20.93 |
| D1 K1 | 19.09 | 24.18 | 20.78 | 20.11 | 21.04 |
| Mean | 19.26 | 22.08 | 19.54 | 20.20 | 20.27 |

(1) (±1.073) For use in horizontal and interaction comparisons
(2) (±0.759) For use in vertical and interaction comparisons

Symbols:
D0 = No dung
D1 = Dung

CON = Continuous rotation
ALT = Alternating rotation

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65/B/4.9

1ST TEST CROP

SUGAR BEET

SUGAR %

| | | N1 | N2 | N3 | N4 | N5 | N6 |
|---|---|---|---|---|---|---|---|
| D0 | Ley | 17.4 | 17.5 | 17.1 | 17.2 | - | - |
| | Lu | 17.8 | 18.2 | 17.5 | 17.7 | - | - |
| | AH | - | - | 18.0 | 17.4 | 17.4 | 16.7 |
| | AR | - | 17.8 | 18.0 | 17.5 | 17.2 | - |
| D1 | Ley | 17.4 | 17.0 | 17.1 | 16.6 | - | - |
| | Lu | 17.4 | 17.7 | 17.4 | 16.7 | - | - |
| | AH | - | - | 17.5 | 17.3 | 17.1 | 16.9 |
| | AR | - | 17.7 | 17.4 | 17.2 | 17.1 | - |

| | Ley | Lu | AH | AR | Mean |
|---|---|---|---|---|---|
| CON | 17.3 | 17.5 | 17.3 | 17.3 | 17.3 |
| ALT | 17.0 | 17.6 | 17.3 | 17.6 | 17.4 |
| D0 K0 | 17.5 | 17.7 | 17.7 | 17.7 | 17.6 |
| D0 K1 | 17.2 | 17.9 | 17.0 | 17.6 | 17.4 |
| D1 K0 | 16.8 | 17.4 | 17.1 | 17.5 | 17.2 |
| D1 K1 | 17.2 | 17.2 | 17.2 | 17.2 | 17.2 |
| Mean | 17.1 | 17.5 | 17.3 | 17.5 | 17.4 |

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65/E/4.10

1ST TEST CROP

SUGAR BEET

TOTAL SUGAR

| | N1 | N2 | N3 | N4 | N5 | N6 |
|---|---|---|---|---|---|---|
| | | | (1) | | | |
| DO Ley | 60.4 | 66.8 | 68.5 | 67.4 | - | - |
| DO Lu | 69.8 | 79.4 | 72.6 | 77.7 | - | - |
| DO AH | - | - | 61.7 | 64.2 | 67.8 | 65.3 |
| DO AR | - | 61.2 | 69.5 | 71.6 | 71.7 | - |
| D1 Ley | 69.8 | 62.8 | 72.8 | 59.3 | - | - |
| D1 Lu | 78.9 | 80.4 | 79.8 | 80.4 | - | - |
| D1 AH | - | - | 66.7 | 72.9 | 71.9 | 68.7 |
| D1 AR | - | 65.5 | 75.4 | 74.1 | 75.5 | - |

| | Ley | Lu | AH | AR | Mean |
|---|---|---|---|---|---|
| CON | 64.6 | 77.1 | 68.9 | 66.9 | 69.4 |
| ALT | 67.4 | 77.6 | 66.0 | 74.2 | 71.3 |
| | | | (2) | | |
| DO K0 | 64.1 | 76.6 | 64.4 | 67.6 | 68.2 |
| DO K1 | 67.5 | 73.1 | 65.1 | 69.5 | 68.8 |
| D1 K0 | 66.9 | 76.7 | 68.5 | 76.0 | 72.0 |
| D1 K1 | 65.4 | 83.1 | 71.7 | 69.2 | 72.4 |
| Mean | 66.0 | 77.4 | 67.4 | 70.6 | 70.3 |

(1) (±3.48) For use in horizontal and interaction comparisons
(2) (±2.46) For use in vertical and interaction comparisons

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65/B/4.11

1ST TEST CROP

SUGAR BEET

TOPS

| | N1 | N2 | N3 | N4 | N5 | N6 |
|---|---|---|---|---|---|---|
| | | | (1) | | | |
| D0 Ley | 16.68 | 18.33 | 20.68 | 20.16 | - | - |
| D0 Lu | 13.21 | 15.14 | 16.44 | 17.86 | - | - |
| D0 AH | - | - | 14.92 | 15.31 | 17.82 | 20.09 |
| D0 AR | - | 10.61 | 12.67 | 13.79 | 17.37 | - |
| D1 Ley | 18.65 | 17.56 | 22.36 | 19.92 | - | - |
| D1 Lu | 18.89 | 19.92 | 19.18 | 19.89 | - | - |
| D1 AH | - | - | 15.80 | 19.04 | 20.36 | 21.55 |
| D1 AR | - | 11.14 | 15.01 | 15.47 | 16.61 | - |

| | Ley | Lu | AH | AR | Mean |
|---|---|---|---|---|---|
| CON | 18.09 | 17.93 | 18.90 | 13.04 | 16.99 |
| ALT | 20.49 | 17.20 | 17.32 | 15.13 | 17.54 |
| | | | (2) | | |
| D0 K0 | 18.27 | 16.53 | 16.41 | 13.43 | 16.16 |
| D0 K1 | 19.66 | 14.79 | 17.65 | 13.78 | 16.47 |
| D1 K0 | 20.23 | 19.11 | 19.65 | 15.02 | 18.50 |
| D1 K1 | 19.01 | 19.83 | 18.73 | 14.10 | 17.92 |
| Mean | 19.29 | 17.57 | 18.11 | 14.08 | 17.26 |

(1) (±1.040) For use in horizontal and interaction comparisons
(2) (±0.736) For use in vertical and interaction comparisons

65/B/4.12

## 2ND TEST CROP

## BARLEY

| 1964 | Ley | Lu | AH | AR | Mean |
|---|---|---|---|---|---|
| | | GRAIN | | | |
| | | (1) and (2) | | | (±0.28) |
| D0 | 38.5 | 42.4 | 41.4 | 41.1 | 40.9 |
| D1 | 36.6 | 44.9 | 42.8 | 43.2 | 41.9 |
| Mean (±1.21) | 37.5 | 43.7 | 42.1 | 42.2 | 41.4 |
| | | STRAW | | | |
| D0 | 52.8 | 33.2 | 32.4 | 34.2 | 38.2 |
| D1 | 48.9 | 37.0 | 29.6 | 40.9 | 39.1 |
| Mean | 50.9 | 35.1 | 31.0 | 37.6 | 38.6 |

Mean D.M. %: Grain: 75.2
Straw: 76.6

(1) (±1.27) For use in horizontal and diagonal comparisons

(2) (±0.56) For use in vertical and interaction comparisons

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