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# Yields of the Field Experiments 1965

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## 65/W/WIR/B/6 Irrigation

### Rothamsted Research

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65/B/6.1

## IRRIGATION EXPERIMENT

(WIR)

Revised 1963

The effects of irrigation and nitrogen - Woburn Butt Close 1965, the 15th year.

For details of previous cropping, treatments etc., see 'Details' 1962 and 'Results' 63/B/6, 64/B/6.

Rotation: The barley crop is now replaced by spring wheat, which receives 0.4 (N1), 0.8 (N2), 1.2 (N3), 1.6 (N4) cwt N as 'Nitro-Chalk' to quarter plots.

Lucerne: This is now replaced by Italian ryegrass. A test of 350 (N1K1) v 700 lb (N2K2) (16:0:16) for each cut is applied to half plots.

### Basal applications:

Manures: Spring wheat: 240 lb (0:14:28) combine drilled, 40 cwt ground chalk.

Italian Ryegrass: 373 lb superphosphate.

Other crops as before.

Weedkillers: Spring wheat: Ioxynil and mecoprop ('Actril' P at 4 pints in 40 gals).

Italian Ryegrass: 2,4-D butoxyethylester at 7 oz a.e. in 40 gals.

Area harvested (Sub plot): Sugar beet - 0.0042, spring wheat - 0.0076, clover - 0.0058, ryegrass - 0.0058.

65/B/6.2

## RAINFALL AND IRRIGATION: INCHES

| Week ending | Rain-fall | Sugar beet |      |      | Spring wheat<br>C | Clover |      |      | Grass |      |      |
|-------------|-----------|------------|------|------|-------------------|--------|------|------|-------|------|------|
|             |           | A          | B    | C    |                   | A      | B    | C    | A     | B    | C    |
| 3 May       | 0.66      |            |      |      |                   |        |      |      |       |      |      |
| 10          | 0.42      |            |      |      |                   |        |      |      |       |      |      |
| 17          | 0.12      |            |      |      |                   |        |      |      |       |      |      |
| 24          | 0.43      |            |      |      | 0.50              | 0.50   | -    | 0.50 |       |      |      |
| 31          | 0.83      | 0.50       | -    | 0.50 |                   |        |      |      | -     | -    | 0.50 |
| 7 June      | 0.24      |            |      |      |                   |        |      |      |       |      |      |
| 14          | 0.84      |            |      |      |                   |        |      |      |       |      |      |
| 21          | 0.67      |            |      |      |                   |        |      |      |       |      |      |
| 28          | 0.37      |            |      |      |                   |        |      |      |       |      |      |
| 5 July      | 0.13      | -          | 0.50 | 0.50 | 0.50              | -      | 0.50 | 0.50 | -     | 0.50 | 0.50 |
| 12          | 0.69      | -          | 0.50 | 0.50 | 0.50              | -      | 0.50 | 0.50 | -     | 0.50 | 0.50 |
| 19          | 0.33      |            |      |      |                   |        |      |      |       |      |      |
| 26          | 1.86      |            |      |      |                   |        |      |      |       |      |      |
| 2 Aug       | 0.29      |            |      |      |                   |        |      |      |       |      |      |
| 9           | 0.81      |            |      |      |                   |        |      |      |       |      |      |
| 16          | 0.02      |            |      |      |                   |        |      |      |       |      |      |
| 23          | 0.55      |            |      |      |                   |        |      |      |       |      |      |
| 30          | 0.85      |            |      |      |                   |        |      |      |       |      |      |
| Total       | 10.11     | 0.50       | 1.00 | 1.50 | 1.50              | 0.50   | 1.00 | 1.50 | 0.00  | 1.00 | 1.50 |

## Cultivations, etc.:

Sugar beet: Ploughed: Oct 9, 1964. Salt applied: Jan 5, 1965.

Basal compound and sulphate of ammonia applied: Mar 31. Seed drilled at 5 lb: Apr 2. Singled (early plots): May 17. Singled (late plots): June 2. Lifted: Oct 5.

Spring wheat: Ground chalk applied: Nov 10, 1964. Ploughed: Nov 11.

Seed combine drilled at 180 lb: Mar 29, 1965. 'Nitro-Chalk' applied: Mar 30. Sprayed: May 11. Combine harvested: Sept 14. Variety: Opal.

Clover: Seed undersown in barley at 30 lb: Apr 27, 1964. Basal compound fertiliser applied: Feb 3, 1965. Cut 3 times: June 11, Aug 5, Oct 19.

Ryegrass: Ploughed: Nov 4, 1964. Basal P and first dressings of NK compound applied: Mar 16, 1965. Seed drilled at 40 lb: Mar 17. Sprayed: May 10. Cut five times: June 11, July 14, Aug 10, Sept 7, Oct 19. NK compound applied after first 4 cuts. Variety: Italian.

65/B/6.3

Standard errors per plot.

Sugar beet. Roots, Whole plot: 0.574 or 3.3% (6 d.f.)  
                   1/2 plot: 0.613 or 3.5% (8 d.f.)  
                   Row strips: 0.587 or 3.3% (8 d.f.)  
                   Total sugar, Whole plot: 1.87 or 3.0% (6 d.f.)  
                                   1/2 plot: 2.65 or 4.3% (8 d.f.)  
                                   Row strips: 1.59 or 2.6% (8 d.f.)  
                   Tops, Whole plot: 0.974 or 5.3% (6 d.f.)  
                                   1/2 plot: 1.938 or 10.5% (8 d.f.)  
                                   Row strips: 0.664 or 3.6% (8 d.f.)

Spring wheat. Grain, Whole plot: 2.32 or 6.3% (5 d.f.)  
                                   1/4 plot: 1.93 or 5.2% (30 d.f.)

Clover. Dry matter, 1st cut. Whole plot: 4.24 or 12.8% (6 d.f.)  
                                   1/2 plot: 1.96 or 5.9% (8 d.f.)  
                   2nd cut. Whole plot: 1.49 or 9.4% (6 d.f.)  
                                   1/2 plot: 1.73 or 10.8% (8 d.f.)  
                   3rd cut. Whole plot: 1.57 or 9.0% (6 d.f.)  
                                   1/2 plot: 0.79 or 4.5% (8 d.f.)  
                   Total of 3 cuts. Whole plot: 5.52 or 8.3% (6 d.f.)  
                                   1/2 plot: 3.59 or 5.4% (8 d.f.)

Ryegrass. Dry matter, 1st cut. Whole plot: 1.25 or 6.3% (6 d.f.)  
                                   1/2 plot: 0.99 or 5.0% (8 d.f.)  
                   2nd cut. Whole plot: 2.10 or 7.0% (6 d.f.)  
                                   1/2 plot: 1.76 or 5.8% (8 d.f.)  
                   3rd cut. Whole plot: 1.09 or 5.6% (6 d.f.)  
                                   1/2 plot: 2.27 or 11.7% (8 d.f.)  
                   4th cut. Whole plot: 0.44 or 4.5% (6 d.f.)  
                                   1/2 plot: 1.20 or 12.3% (8 d.f.)  
                   5th cut. Whole plot: 1.13 or 8.0% (6 d.f.)  
                                   1/2 plot: 1.27 or 9.0% (8 d.f.)  
                   Total of 5 cuts. Whole plot: 3.34 or 3.6% (6 d.f.)  
                                   1/2 plot: 3.63 or 3.9% (8 d.f.)

Errata to Results 64/B/6.1, 'Area harvested'. These were all sub plots and not as stated.

65/B/6.4

## SUMMARY OF RESULTS

## SUGAR BEET

|                      | O     | A           | B     | C     | Mean            |
|----------------------|-------|-------------|-------|-------|-----------------|
| ROOTS                |       |             |       |       |                 |
| Mean ( $\pm 0.331$ ) | 18.35 | 17.67       | 17.48 | 16.84 | 17.59           |
|                      |       | (1) and (2) |       |       |                 |
|                      |       |             |       |       | ( $\pm 0.177$ ) |
| N1                   | 18.46 | 17.08       | 16.98 | 16.06 | 17.15           |
| N2                   | 18.25 | 18.26       | 17.98 | 17.62 | 18.03           |
|                      |       | (3) and (4) |       |       |                 |
|                      |       |             |       |       | ( $\pm 0.170$ ) |
| E                    | 18.41 | 17.96       | 17.89 | 17.18 | 17.86           |
| L                    | 18.30 | 17.38       | 17.07 | 16.50 | 17.31           |
| SUGAR %              |       |             |       |       |                 |
| Mean                 | 17.7  | 17.5        | 17.8  | 17.6  | 17.6            |
| N1                   | 17.6  | 17.6        | 17.8  | 17.5  | 17.6            |
| N2                   | 17.8  | 17.4        | 17.7  | 17.6  | 17.6            |
| E                    | 17.5  | 17.6        | 17.8  | 17.6  | 17.6            |
| L                    | 17.8  | 17.3        | 17.7  | 17.5  | 17.6            |

(1) ( $\pm 0.415$ ) (3) ( $\pm 0.409$ ) For use in horizontal and diagonal comparisons  
 (2) ( $\pm 0.354$ ) (4) ( $\pm 0.339$ ) For use in vertical and interaction comparisons

65/B/6.5

## SUGAR BEET

|                     | O    | A           | B    | C    | Mean           |
|---------------------|------|-------------|------|------|----------------|
| TOTAL SUGAR         |      |             |      |      |                |
| Mean ( $\pm 1.08$ ) | 64.9 | 61.8        | 62.0 | 59.2 | 62.0           |
|                     |      | (1) and (2) |      |      | ( $\pm 0.76$ ) |
| N1                  | 65.0 | 60.0        | 60.6 | 56.4 | 60.5           |
| N2                  | 64.8 | 63.6        | 63.5 | 62.1 | 63.5           |
|                     |      | (3) and (4) |      |      | ( $\pm 0.46$ ) |
| E                   | 64.5 | 63.3        | 63.7 | 60.5 | 63.0           |
| L                   | 65.3 | 60.3        | 60.4 | 57.9 | 61.0           |

(1) ( $\pm 1.53$ ) (3) ( $\pm 1.26$ ) For use in horizontal and diagonal comparisons(2) ( $\pm 1.53$ ) (4) ( $\pm 0.92$ ) For use in vertical and interaction comparisons

## TORS

|                      |       |             |       |       |                 |
|----------------------|-------|-------------|-------|-------|-----------------|
| Mean ( $\pm 0.563$ ) | 18.60 | 18.12       | 18.89 | 18.34 | 18.49           |
|                      |       | (1) and (2) |       |       | ( $\pm 0.559$ ) |
| N1                   | 16.99 | 15.56       | 16.35 | 15.45 | 16.09           |
| N2                   | 20.21 | 20.69       | 21.43 | 21.22 | 20.89           |
|                      |       | (3) and (4) |       |       | ( $\pm 0.192$ ) |
| E                    | 18.41 | 18.68       | 18.84 | 19.00 | 18.73           |
| L                    | 18.79 | 17.57       | 18.94 | 17.67 | 18.24           |

(1) ( $\pm 0.971$ ) (3) ( $\pm 0.624$ ) For use in horizontal and diagonal comparisons(2) ( $\pm 1.119$ ) (4) ( $\pm 0.383$ ) For use in vertical and interaction comparisons

65/B/6.6

SPRING WHEAT

N

|                     | 1           | 2    | 3    | 4    | Mean           |
|---------------------|-------------|------|------|------|----------------|
| GRAIN               |             |      |      |      |                |
|                     | (1) and (2) |      |      |      | ( $\pm 0.95$ ) |
| D                   | 32.8        | 38.1 | 36.8 | 35.8 | 35.9           |
| C                   | 34.8        | 42.0 | 38.7 | 35.2 | 37.7           |
| Mean ( $\pm 0.56$ ) | 33.8        | 40.1 | 37.8 | 35.5 | 36.8           |

Mean D.M. %: 76.7

STRAW

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| D    | 26.5 | 32.6 | 29.7 | 31.4 | 30.0 |
| C    | 32.3 | 35.1 | 36.3 | 31.9 | 33.9 |
| Mean | 29.4 | 33.8 | 33.0 | 31.6 | 32.0 |

Mean D.M. %: 68.5

(1) ( $\pm 1.17$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 0.79$ ) For use in vertical and interaction comparisons

65/B/6.7

CLOVER

|                     | O    | A           | B    | C    | Mean           |
|---------------------|------|-------------|------|------|----------------|
| 1ST CUT*            |      |             |      |      |                |
|                     |      | (1) and (2) |      |      | ( $\pm 0.57$ ) |
| N1                  | 8.0  | 32.0        | 31.9 | 34.6 | 34.1           |
| N2                  | 33.6 | 33.9        | 28.8 | 30.9 | 31.8           |
| Mean ( $\pm 2.45$ ) | 35.8 | 32.9        | 30.4 | 32.7 | 33.0           |

Mean D.M. %: 15.5

(1) ( $\pm 2.57$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 1.13$ ) For use in vertical and interaction comparisons

2ND CUT

|                     |      |             |      |      |                |
|---------------------|------|-------------|------|------|----------------|
|                     |      | (1) and (2) |      |      | ( $\pm 0.50$ ) |
| N1                  | 14.6 | 16.1        | 14.8 | 17.4 | 15.7           |
| N2                  | 15.8 | 13.6        | 16.5 | 18.8 | 16.1           |
| Mean ( $\pm 0.86$ ) | 15.2 | 14.8        | 15.6 | 18.1 | 15.9           |

Mean D.M. %: 16.8

(1) ( $\pm 1.11$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 1.00$ ) For use in vertical and interaction comparisons

65/B/6.8

CLOVER

|                     | O           | A    | B    | C    | Mean           |
|---------------------|-------------|------|------|------|----------------|
| 3RD CUT             |             |      |      |      |                |
|                     | (1) and (2) |      |      |      | ( $\pm 0.23$ ) |
| N1                  | 17.2        | 16.8 | 17.2 | 17.4 | 17.1           |
| N2                  | 17.0        | 19.0 | 17.7 | 17.4 | 17.8           |
| Mean ( $\pm 0.91$ ) | 17.1        | 17.9 | 17.4 | 17.4 | 17.5           |

Mean D.M. %: 15.9

(1) ( $\pm 0.96$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 0.46$ ) For use in vertical and interaction comparisons

TOTAL OF 3 CUTS

|                     |             |      |      |      |                |
|---------------------|-------------|------|------|------|----------------|
|                     | (1) and (2) |      |      |      | ( $\pm 1.04$ ) |
| N1                  | 69.7        | 64.8 | 63.9 | 69.4 | 66.9           |
| N2                  | 66.5        | 66.5 | 63.0 | 67.0 | 65.7           |
| Mean ( $\pm 3.19$ ) | 68.1        | 65.7 | 63.4 | 68.2 | 66.3           |

Mean D.M. %: 16.1

(1) ( $\pm 3.51$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 2.07$ ) For use in vertical and interaction comparisons

65/B/6.9

| RYEGRASS |                        |                        |      |                |
|----------|------------------------|------------------------|------|----------------|
|          | O & A                  | B                      | C    | Mean           |
| 1ST CUT  |                        |                        |      |                |
|          | (1) and (2)            | (3) and (4)            |      | ( $\pm 0.28$ ) |
| N1K1     | 17.2                   | 14.8                   | 16.6 | 16.4           |
| N2K2     | 22.9                   | 23.2                   | 23.2 | 23.0           |
| Mean     | 20.0<br>( $\pm 0.51$ ) | 19.0<br>( $\pm 0.72$ ) | 19.9 | 19.7           |

Mean D.M. %: 15.0

(1) ( $\pm 0.58$ ) (3) ( $\pm 0.82$ ) For use in horizontal and diagonal comparisons(2) ( $\pm 0.40$ ) (4) ( $\pm 0.57$ ) For use in vertical and interaction comparisons

| 2ND CUT |                        |                        |      |                |
|---------|------------------------|------------------------|------|----------------|
|         | (1) and (2)            | (3) and (4)            |      | ( $\pm 0.51$ ) |
| N1K1    | 28.8                   | 27.5                   | 28.8 | 28.5           |
| N2K2    | 31.6                   | 31.2                   | 32.7 | 31.8           |
| Mean    | 30.2<br>( $\pm 0.86$ ) | 29.3<br>( $\pm 1.21$ ) | 30.8 | 30.1           |

Mean D.M. %: 12.1

(1) ( $\pm 0.99$ ) (3) ( $\pm 1.41$ ) For use in horizontal and diagonal comparisons(2) ( $\pm 0.72$ ) (4) ( $\pm 1.02$ ) For use in vertical and interaction comparisons

NOTE: All cuts O = A  
1st cut O = A = B

65/B/6.10

| RYEGRASS |                        |                        |      |                |
|----------|------------------------|------------------------|------|----------------|
|          | O & A                  | B                      | C    | Mean           |
| 3RD CUT  |                        |                        |      |                |
|          | (1) and (2)            | (3) and (4)            |      | ( $\pm 0.66$ ) |
| N1K1     | 20.5                   | 19.4                   | 18.4 | 19.7           |
| N2K2     | 20.2                   | 19.7                   | 17.0 | 19.3           |
| Mean     | 20.4<br>( $\pm 0.44$ ) | 19.5<br>( $\pm 0.63$ ) | 17.7 | 19.5           |

Mean D.M. %: 12.8

(1) ( $\pm 0.79$ ) (3) ( $\pm 1.12$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 0.93$ ) (4) ( $\pm 1.31$ ) For use in vertical and interaction comparisons

| 4TH CUT |                       |                        |      |                |
|---------|-----------------------|------------------------|------|----------------|
|         | (1) and (2)           | (3) and (4)            |      | ( $\pm 0.35$ ) |
| N1K1    | 11.0                  | 11.3                   | 11.1 | 11.1           |
| N2K2    | 8.2                   | 8.7                    | 8.3  | 8.4            |
| Mean    | 9.6<br>( $\pm 0.18$ ) | 10.0<br>( $\pm 0.25$ ) | 9.7  | 9.7            |

Mean D.M. %: 13.1

(1) ( $\pm 0.39$ ) (3) ( $\pm 0.55$ ) For use in horizontal and diagonal comparisons

(2) ( $\pm 0.49$ ) (4) ( $\pm 0.69$ ) For use in vertical and interaction comparisons

NOTE: All cuts O = A  
1st cut O = A = B

65/B/6.11

| RYEGRASS |                 |                 |      |         |
|----------|-----------------|-----------------|------|---------|
|          | O & A           | B               | C    | Mean    |
| 5TH CUT  |                 |                 |      |         |
|          | (1) and (2)     | (3) and (4)     |      | (±0.37) |
| N1K1     | 14.8            | 15.5            | 13.8 | 14.7    |
| N2K2     | 12.8            | 13.9            | 14.5 | 13.5    |
| Mean     | 13.8<br>(±0.46) | 14.7<br>(±0.65) | 14.2 | 14.1    |

Mean D.M. %: 12.8

(1) (±0.59) (3) (±0.83) For use in horizontal and diagonal comparisons

(2) (±0.52) (4) (±0.73) For use in vertical and interaction comparisons

| TOTAL OF 5 CUTS |                 |                 |      |         |
|-----------------|-----------------|-----------------|------|---------|
|                 | (1) and (2)     | (3) and (4)     |      | (±1.05) |
| N1K1            | 92.3            | 88.6            | 88.7 | 90.5    |
| N2K2            | 95.9            | 96.7            | 95.6 | 96.0    |
| Mean            | 94.1<br>(±1.36) | 92.7<br>(±1.93) | 92.2 | 93.2    |

Mean D.M. %: 13.2

(1) (±1.72) (3) (±2.43) For use in horizontal and diagonal comparisons

(2) (±1.48) (4) (±2.10) For use in vertical and interaction comparisons

NOTE: All cuts O = A  
1st cut O = A = B