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# Yields of the Field Experiments 1971

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## Beans

### Rothamsted Research

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71/R/BE/1

SPRING BEANS

CHEMICAL CONTROL OF SOIL-BORNE PATHOGENS

Object: To study the effects of a range of chemicals on wilting and yield of beans grown continuously for five years - Barnfield Section I Plot 3 (unmanured).

Design: 4 blocks of 6 plots.

Whole plot dimensions: 3.73 x 2.29. Area harvested: 0.00039.

Treatments: Chemicals applied as dusts, except formalin:-

|  |      |
|--|------|
| None   | (O)  |
| Fungicide, 70% 'Dexon' at 78.5 kg a.i.                                   | (F)  |
| Insecticide, 25% gamma BHC at 4.5 kg a.i.                                | (I)  |
| Nematicide, 10% aldicarb ('Temik') at 11.2 kg a.i.                       | (N)  |
| Biocide, formalin at 3000 l of a 38% solution of formaldehyde in 54400 l | (B)  |
| Aldicarb and formalin together at the rates shown above                  | (NB) |

The plots which received dusts were rotary cultivated immediately after the application.

Basal applications: Manures-none. Weedkillers: Paraquat at 0.84 kg ion in 225 l. Simazine at 1.12 kg in 225 l. Insecticide: Demeton-s-methyl at 245 g in 438 l.

Cultivations, etc.: Paraquat applied: 11 Sept, 1970. Ploughed: 19 Oct. Formalin applied: 25 Nov. Chemical dusts applied and rotary cultivated in: 26 Feb, 1971. Seed drilled at 224 kg: 4 Mar. Simazine applied: 10 Mar. Insecticide applied: 1 July. Harvested by hand: 25 Aug. Variety: Maris Bead.

NOTE: Wilted and virus infected plants were counted during the season. Crop samples were taken for root disease assessment. Counts were made of stem eelworm (*Ditylenchus dipsaci*).

Standard error per plot.

Grain, tonnes/hectare: 0.219 or 13.0% (15 d.f.)

71/R/BE/1

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| O    | F    | I        | N    | B    | NB   | Mean |
|------|------|----------|------|------|------|------|
|      |      | (±0.110) |      |      |      |      |
| 1.07 | 1.96 | 1.51     | 2.43 | 1.23 | 1.89 | 1.68 |

Mean D.M. %: 78.2

71/W/BE/1

CONTROL OF SITONA

Object: To compare the effects of a range of insecticides on yield and incidence of Sitona on beans - Woburn Lansome II.

Design: 4 blocks of 10 plots.

Whole plot dimensions: 2.13 x 4.27. Area harvested: 0.00023,

Treatments:

|   |      |
|---|------|
| Insecticides: None, no rotary cultivation   | (OO) |
| None, rotary cultivation before sowing      | (OR) |
| 4.4 kg aldicarb, rotary cultivated in       | (AL) |
| 2.2 kg gamma BHC, rotary cultivated in      | (B2) |
| 4.4 kg gamma BHC, rotary cultivated in      | (B4) |
| 4.4 kg a.i. 'C 10015', rotary cultivated in | (CA) |
| 4.4 kg a.i. 'C 18244', rotary cultivated in | (CB) |
| 4.4 kg a.i. 'DP 1410', rotary cultivated in | (DP) |
| 4.4 kg a.i. 'MC 2420', rotary cultivated in | (MC) |
| 4.4 kg phorate, rotary cultivated in        | (PH) |

Basal applications: 448 kg (0:14:28). Weedkiller: Simazine at 0.84 kg in 371 l. Insecticide: Demeton-s-methyl at 246 ml in 416 l.

Cultivations, etc.: Ploughed: 4 - 7 Sept, 1970. Deep-tine cultivated: 21 Oct. Treatments applied, all plots rotary cultivated except (OO) plots, PK placed and seed drilled at 224 kg: 12 Mar, 1971. Weed-killer applied: 27 Mar. Insecticide applied: 30 June. Hand harvested: 27 Aug. Variety: Maris Bead. Previous crops: Barley 1969, beans 1970.

NOTES: (1) Soil samples were taken early and late in the season for counts of Sitona larvae.  
(2) Plant growth assessments were made throughout the growing season.

Standard error per plot.

Grain: tonnes/hectare: 0.411 or 20.5% (27 d.f.)

71/W/BE/1

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| OO       | OR   | AL   | B2   | B4   | CA   | CB   | DP   | MC   | PH   | Mean |
|----------|------|------|------|------|------|------|------|------|------|------|
| (±0.206) |      |      |      |      |      |      |      |      |      |      |
| 1.96     | 1.78 | 2.64 | 1.85 | 1.79 | 1.98 | 1.75 | 2.35 | 1.67 | 2.28 | 2.01 |

Mean D.M. %: 86.0

71/R/BE/2 and 71/W/BE/2

SPRING BEANS

EFFECTS OF SITONA ON YIELD

Object: To study the effects of two rates of BHC on yield and control of *Sitona* larvae on beans - Rothamsted (R) Long Hoos VII and Woburn (W) Lansome II.

Design: 6 randomised blocks of 3 plots.

Whole plot dimensions: 5.33 x 9.14. Area harvested 0.00293.

Treatments: Insecticide: None, 2.2, and 4.4 kg BHC applied as a slurry and rotary cultivated in.

Basal applications:-

Long Hoos VII (R): 7530 kg ground chalk. 405 kg (0:14:28) placement drilled. Weedkiller: Simazine at 1.12 kg in 225 l. Insecticide: Demeton-s-methyl at 245 g in 438 l.

Lansome II (W): 448 kg (0:14:28) placement drilled. Weedkiller: Simazine at 0.84 kg in 371 l. Insecticide: Demeton-s-methyl at 245 g in 416 l.

Cultivations, etc.:

Long Hoos VII (R): Chalk applied: 21 Sept, 1970. Ploughed: 30 Oct. Treatment insecticide applied and rotary cultivated in, seed placement drilled at 224 kg: 1 Mar, 1971. Weedkiller applied: 11 Mar. Basal insecticide applied: 2 July. Combine harvested: 3 Sept. Variety: Maris Bead. Previous crops: Winter wheat 1969 and 1970.

Lansome II (W): Ploughed: 4 Sept, 1970. Deep-tine cultivated: 21 Oct. Treatment insecticide applied and rotary cultivated in: 12 Mar, 1971. Seed placement drilled at 224 kg: 13 Mar. Weedkiller applied: 27 Mar. Basal insecticide applied: 30 June. Combine harvested: 2 Sept. Variety: Maris Bead. Previous crops: Barley 1969 and 1970.

NOTE: Estimates of *Sitona* larvae on roots and in soil were made, also estimates of plant growth.

Standard errors per plot. Grain, tonnes/hectare:

Long Hoos VII (R): 0.131 or 4.9% (10 d.f.)

Lansome II (W): 0.224 or 11.0% (10 d.f.)

71/R/BE/2 and 71/W/BE/2

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| BHC: KG/HA        |          |      |      |
|-------------------|----------|------|------|
| 0                 | 2.2      | 4.4  | Mean |
| LONG HOOS VII (R) |          |      |      |
|                   | (±0.053) |      |      |
| 2.59              | 2.74     | 2.71 | 2.68 |
| LANSOME II (W)    |          |      |      |
|                   | (±0.092) |      |      |
| 2.01              | 2.06     | 2.07 | 2.05 |

Mean D.M. %: Long Hoos VII (R): 80.4  
 Lansome II (W): 80.3

71/R/BE/3

SPRING BEANS

CONTROL OF VECTORS AND VIRUSES

Object: To study the effects of a range of insecticide treatments on yield and incidence of weevils, aphids and virus diseases of beans - Long Hoos VI.

Design: 4 randomised blocks of 6 plots.

Whole plot dimension: 10.7 x 12.2. Area harvested: 0.00293.

Treatments: Insecticides:

|                                |       |
|--------------------------------|-------|
| None                           | (O)   |
| Applied to soil:-              |       |
| Aldicarb 1.12 kg               | (AS1) |
| Aldicarb 11.2 kg               | (AS2) |
| Foliar sprays on 3 occasions:- |       |
| BHC 0.56 kg                    | (BF)  |
| Malathion 1.12 kg              | (MAF) |
| Menazon 0.28 kg                | (MEF) |

The first and second sprays were applied in 524 l, the third in 700 l.

Basal applications: 7530 kg ground chalk. 405 kg (0:14:28) placement drilled. Weedkiller: Simazine at 1.12 kg in 225 l.

Cultivations, etc.: Ground chalk applied: 21 Sept, 1970. Ploughed: 30 Oct. Aldicarb applied, all plots rotary cultivated, seed placement drilled at 224 kg: 1 Mar, 1971. Weedkiller applied: 11 Mar. Foliar sprays applied: 27 Apr, 18 May, 30 June. Combine harvested: 3 Sept. Variety: Maris Bead. Previous crops: Lucerne and Cocksfoot (fallowed after 1st cut) 1969, winter wheat 1970.

NOTE: Aphid and weevil counts were made and virus incidence assessed.

Standard error per plot.

Grain, tonnes/hectare: 0.232 or 7.6% (15 d.f.)



71/R/BE/3

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| 0    | AS1  | AS2      | BF   | MAF  | MEF  | Mean |
|------|------|----------|------|------|------|------|
|      |      | (±0.116) |      |      |      |      |
| 2.84 | 3.04 | 3.30     | 2.96 | 3.14 | 3.12 | 3.07 |

Mean D.M. %: 80.7

71/R/BE/5

SPRING BEANS

EFFECTS OF APHIDS

Object: To study the effects of applying liquid or granular insecticides at different times on yield of beans and aphid control - Long Hoos I and II.

Design: 5 randomised blocks of 6 plots.

Whole plot dimensions: 5.33 x 12.2. Area harvested: 0.00390.

Treatments: Insecticides:-

|  |       |
|--|-------|
| None   | (O)   |
| Treated with 1.19 kg of phorate in granules:-      |       |
| At start of flowering                              | (GE)  |
| At end of flowering                                | (GL)  |
| Sprayed with demeton-s-methyl at 2.45 g in 562 l:- |       |
| At start of flowering                              | (SE)  |
| At end of flowering                                | (SL)  |
| At start and again at end of flowering             | (SEL) |

Basal applications: 7530 kg ground chalk. 405 kg (0:14:28) applied by 'Tume' drill across plots. Weedkiller: Simazine at 1.12 kg in 225 l.

Cultivations, etc.: Chalk applied: 7 Sept, 1970. Ploughed: 29 Sept. Basal PK applied: 24 Feb, 1971. Seed drilled at 224 kg: 27 Feb. Weedkiller applied: 12 Mar. Phorate applied: GE plots - 16 June, GL plots - 9 July. Demeton-s-methyl applied: SE and SEL plots - 30 June, SL and SEL plots - 17 July. Combine harvested: 7 Sept. Variety: Maris Bead. Previous crops: Winter wheat 1969, spring wheat 1970.

NOTE: Aphid counts and estimates of plant growth were made in the earlier part of the season but were discontinued after mid-July because *Aphis fabae* was not present on the experimental area.

Standard error per plot.

Grain, tonnes/hectare: 0.187 or 8.5% (20 d.f.)

71/R/BE/5

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| O               | GE   | GEL  | SE   | SL   | SEL  | Mean |
|-----------------|------|------|------|------|------|------|
| <hr/>           |      |      |      |      |      |      |
| ( $\pm 0.084$ ) |      |      |      |      |      |      |
| 2.15            | 2.42 | 1.94 | 2.16 | 2.30 | 2.26 | 2.20 |

Mean D.M. %: 84.6

71/R/BE/6

SPRING BEANS

VARIETIES AND BROAD BEAN STAIN VIRUS

Object: To study the susceptibility of different varieties and sources of beans to broad bean stain virus and to compare yields - Long Hoos I and II.

Design: 4 randomised blocks of 13 plots.

Whole plot dimensions: 4.05 x 15.2. Area harvested: 0.00464.

Treatments: Varieties:

|                             |       |
|-----------------------------|-------|
| Blue Rock                   | (BR)  |
| Francks Ackerperle          | (FA)  |
| F1 hybrid 6 x S45           | (F1)  |
| Herz Freya                  | (HF)  |
| Maxime                      | (MA)  |
| Maris Bead: Cambridge stock | (MBC) |
| Cheshire stock              | (MBN) |
| Rothamsted stock            | (MBR) |
| Lincolnshire stock          | (MBL) |
| Minor                       | (MI)  |
| Ostlers                     | (OS)  |
| Tarvin                      | (TA)  |
| Throws MS                   | (TH)  |

Basal applications: 7530 kg ground chalk. 405 kg (0:14:28) applied by Tume drill across plots. Weedkiller: Dinoseb acetate at 2.7 kg in 426 l. Insecticide: Demeton-s-methyl at 245 g in 438 l. Irrigation: 25.4 mm (1 inch).

Cultivations, etc.: Chalk applied: 7 Sept, 1970. Ploughed: 29 Sept. Basal PK applied: 24 Feb, 1971. Seed drilled at 224 kg: 11 Mar. Weedkiller applied: 11 May. Irrigated: 15 May. Insecticide applied: 3 July. Combine harvested: 9 Sept. Previous crops: Winter wheat 1969, spring wheat 1970.

NOTE: Incidence of virus was recorded on all plots. Aphid and weevil infestations were recorded. The dinoseb acetate spray severely scorched all plants and probably affected yield.

Standard error per plot:

Grain, tonnes/hectare: 0.187 or 9.5% (36 d.f.)

71/R/BE/6

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|  | BR       | FA   | FL   | HF   | MA   | MBC  | MBN  | MBR  | MBL  | MI   | OS   | TA   | TH   | Mean |
|--|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|  | 1.87     | 1.82 | 2.04 | 1.86 | 2.06 | 1.94 | 2.07 | 2.00 | 2.05 | 2.13 | 2.01 | 1.97 | 1.90 | 1.98 |
|  | (±0.094) |      |      |      |      |      |      |      |      |      |      |      |      |      |

Mean D.M.%: 85.6

71/R/BE/7

SPRING BEANS

ROW SPACING, DRILLS AND WEEDKILLERS

Object: To compare the performance of different drills, sowing at different row spacings and depths and to compare the effects of different weedkillers - Long Hoos I and II.

Design: Four randomised blocks of 14 plots.

Whole plot dimensions: 4.27 x 15.2. Area harvested: 0.00488.

Treatments: All combinations of:-

1. Drills and row spacing:-

| Drills         | Distance apart of rows |          |        |
|----------------|------------------------|----------|--------|
|                | cm                     | (inches) |        |
| Smythe:-       | 53.3                   | (21)     | (S21)  |
| Fiona (NIAE):- | 17.8                   | (7)      | (F7)   |
|                | 35.6                   | (14)     | (F14)  |
|                | 53.3                   | (21)     | (F21)  |
| New Tume:-     | 15.2                   | (6)      | (NT6)  |
|                | 30.5                   | (12)     | (NT12) |
| Old Tume:-     | 25.4                   | (10)     | (OT10) |

2. Weedkillers: Dinoseb acetate at 2.7 kg in 426 l (D), simazine at 1.12 kg in 225 l (S).

Basal applications: Ground chalk at 7530 kg. 405 kg (0:14:28) applied by Tume drill across the plots. Insecticide: Demeton-s-methyl at 245 g in 438 l.

Cultivations, etc.: Chalk applied: 7 Sept, 1970. Ploughed: 29 Sept. Basal PK applied: 24 Feb, 1971. Seed drilled at 224 kg: 10 - 11 Mar. Simazine applied: 13 Mar. Dinoseb acetate applied: 4 May. Insecticide applied: 1 July. Combine harvested: 9 Sept. Variety: Maris Bead. Previous crops: Winter wheat and barley 1969, spring wheat 1970.

Standard error per plot.

Grain, tonnes/hectare: 0.159 or 8.3% (39 d.f.)

71/R/BE/7

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|               | S21      | F7   | F14  | F21  | NT6  | NT12 | OT10 | Mean     |
|---------------|----------|------|------|------|------|------|------|----------|
|               | (±0.079) |      |      |      |      |      |      | (±0.030) |
| D             | 2.07     | 1.91 | 1.75 | 1.84 | 2.12 | 1.99 | 2.14 | 1.97     |
| S             | 1.96     | 1.82 | 1.73 | 1.71 | 1.91 | 1.97 | 1.95 | 1.86     |
| Mean (±0.056) | 2.01     | 1.86 | 1.74 | 1.78 | 2.01 | 1.98 | 2.04 | 1.92     |

Mean D.M. %: 86.0

71/R/BE/8

SPRING BEANS

PHOTOSYNTHETIC ZONES

Object: To study the effects of defoliating different zones of the bean plant on yield - Long Hoos V.

Design: 3 blocks of 2 x 2 x 2 randomisation restricted.

Whole plot dimensions: 2.03 x 4.27. Area harvested: 0.00019.

Treatments: All combinations of:-

1. Defoliation in Zone A: none (O), leaves removed when first flower buds formed (A).
2. Defoliation in Zone B: none (O), leaves removed when first flower buds formed on 9th flowering node (B).
3. Decapitation of Zone C: none (O), decapitation (C) on 3 July.

where (1) Zone A is the section of stem (about 9 nodes) below the first flowering node.

(2) Zone B is the section of stem with the 9 nodes which flower first.

(3) Zone C is the section of stem above the 9th flowering node.

Basal applications: 415 kg (0:14:28) broadcast and rotary cultivated in before sowing. Weedkiller: Simazine at 0.84 kg in 337 l. Insecticide: Demeton-s-methyl at 245 g in 337 l.

Cultivations, etc.: Ploughed: 29 Oct, 1970. Basal PK applied: 4 Mar, 1971. Rotary cultivated, seed drilled at 224 kg: 12 Mar. Weedkiller applied: 17 Mar. Zone A defoliated: 8 June. Insecticide applied: 29 June. Zone B defoliated: 30 June. Zone C decapitated: 3 July. Harvested by hand: 2 Sept. Variety: Tarvin. Previous crops: Potatoes 1969, spring wheat 1970.

NOTE: Counts were made of the number of stems and pods. 1000 grain weights were measured.

Standard error per plot.

Grain, tonnes/hectare: 0.177 or 7.9% (14 d.f.)



71/R/BE/8

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|               | O        | B    | O        | C    | Mean     |
|---------------|----------|------|----------|------|----------|
|               | (±0.072) |      | (±0.072) |      | (±0.051) |
| O             | 3.15     | 1.76 | 2.76     | 2.15 | 2.46     |
| A             | 2.86     | 1.14 | 2.41     | 1.58 | 2.00     |
|               |          |      | (±0.072) |      | (±0.051) |
|               |          | O    | 3.06     | 2.95 | 3.00     |
|               |          | B    | 2.12     | 0.78 | 1.45     |
| Mean (±0.051) |          |      | 2.59     | 1.87 | 2.23     |

|   | O        | B    | O    | A    | B |
|---|----------|------|------|------|---|
|   | (±0.102) |      |      |      |   |
| O | 3.22     | 3.08 | 2.89 | 2.82 |   |
| C | 2.31     | 1.22 | 1.93 | 0.35 |   |

Mean D.M. %: 82.6

71/R/BE/9

SPRING BEANS

SEED RATES, ROW SPACING AND GROWTH REGULATORS

Object: To study the effects of plant density and growth regulators on yield of beans- Long Hoos V.

Design: 3 randomised blocks of 4 plots, split into 4.

Whole plot dimensions: 2.74 x 17.1. Sub plot area harvested: 0.00019.

Treatments:

Whole plots: All combinations of:-

1. Seed rates: 224 (1), 448 (2) kg.
2. Distance between rows: 50.8 cm (20 inches) (W), 12.7 cm (5 inches) (C).

Sub plots:

3. Growth regulators: None (0), 'B9' at 4.48 kg a.i. on one occasion (B1), B9 at 4.48 kg a.i. on each of three occasions (B3), PP412 at 4.48 kg a.i. on one occasion (F1). Each as a spray in 629 l.

Basal applications: 415 kg (0:14:28) broadcast and rotary cultivated in. Weedkiller: Simazine at 0.84 kg in 337 l. Insecticide: Demeton-s-methyl at 245 g in 337 l.

Cultivations, etc.: Ploughed: 29 Oct, 1970. Basal PK applied: 4 Mar, 1971. Rotary cultivated, seed drilled: 12 Mar. Weedkiller applied: 17 Mar. Growth regulators applied: B1 and B3 - 11 May, B3 - 2 June and 23 June, F1 - 23 June. Insecticide applied: 29 June. Harvested by hand: 6 Sept. Variety: Tarvin. Previous crops: Potatoes 1969, spring wheat 1970.

NOTE: Stem heights were measured. Counts were made of the number of stems and pods. 1000 grain weights were measured.

Standard errors per plot.

Grain, tonnes/hectare: Whole plot: 0.209 or 5.8% (6 d.f.)  
Sub plot: 0.267 or 7.5% (24 d.f.)

71/R/BE/9

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|                      | 1               | 2    | 0           | B1   | B3   | F1   | Mean            |
|----------------------|-----------------|------|-------------|------|------|------|-----------------|
|                      | ( $\pm 0.120$ ) |      | (1) and (2) |      |      |      | ( $\pm 0.085$ ) |
| W                    | 3.35            | 3.68 | 3.35        | 3.48 | 4.24 | 2.99 | 3.51            |
| C                    | 3.50            | 3.75 | 3.29        | 3.65 | 4.25 | 3.30 | 3.62            |
|                      |                 |      | (1) and (2) |      |      |      | ( $\pm 0.085$ ) |
|                      |                 | 1    | 3.16        | 3.38 | 4.09 | 3.06 | 3.42            |
|                      |                 | 2    | 3.48        | 3.75 | 4.40 | 3.23 | 3.71            |
| Mean ( $\pm 0.077$ ) |                 |      | 3.32        | 3.57 | 4.25 | 3.14 | 3.57            |

Mean D.M. %: 83.3

(1) ( $\pm 0.127$ ) For use in vertical and diagonal comparisons only

(2) ( $\pm 0.109$ ) For use in horizontal and interaction comparisons only