ROTHAMSTED RESEARCH

Yields of the Field Experiments 1977

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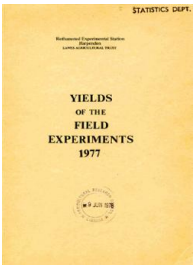

Beans

Rothamsted Research

Rothamsted Research (1978) *Beans ;* Yields Of The Field Experiments 1977, pp 372 - 386 **- DOI: https://doi.org/10.23637/ERADOC-1-29**

77/R/BE/1

WINTER BEANS

CROP DENSITY AND CHOCOLATE SPOT

Object: To study the effects of irrigation, plant density and benomyl on Chocolate Spot (Botrytis spp.) and yield of winter beans - Fosters Corner.

Sponsor: A. Bainbridge, M.E. Finney.

Design: 2 randomised blocks of 12 plots (with IRRIGTN on blocks)

Whole plot dimensions: 5.33 x 9.14.

Treatments: All combinations of:-

Blocks

1.	IRRIGTN	Irrigation:
	NONE	None
	FULL	Full (100 mm)

Plots

2.	FUNGTIME	Times of applying benomyl (at 0.56 kg in 340 l on each occasion):
	NEVER	Never
	ONCE	Once, on 30 May, 1977
	TWICE	Twice, on 30 May and 21 June
3.	SEEDRATE	Seed rates (kg):
	126	
	378	
4.	SPACING	Spacing between rows:
	18 CM	18 cm (7 inches)
	53 CM	53 cm (21 inches)

NOTE: 25 mm of irrigation to IRRIGTN FULL plots was supplied on each of the following dates:- 27 June, 12 July, 15 July, 22 July.

Basal applications: Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Throws MS.

Cultivations, etc.:- Deep-tine cultivated: 31 Aug, 1976, 3 Sept. Heavy spring-tine cultivated: 21, 22 Sept, 3 Nov. Seed sown: 3 Nov. Spring-tine cultivated: 4 Nov. Weedkiller applied: 15 Apr, 1977. Combine harvested: 14 Sept. Previous crops: Spring wheat 1975, barley 1976.

NOTE: Counts were made of seedling emergence, percentage leaf area affected by Botrytis spp, stems per row, pods per stem and leaf roll virus infected plants.

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGTIME IRRIGTN	NEVER	ONCE	TWICE	MEAN
NONE	3.55	3.90	4.42	3.96
FULL	3.15	3.82	3.21	3.39
MEAN	3.35	3.86	3.81	3.67

SEEDRATE IRRIGTN	126	378	MEAN
NONE	3.49	4.43	3.96
FULL	3.21	3.57	3.39
MEAN	3.35	4.00	3.67

SEEDRATE FUNGTIME	126	378	MEAN
NEVER	3.10	3.61	3.35
ONCE	3.62	4.09	3.86
TWICE	3.33	4.30	3.81
MEAN	3.35	4.00	3.67

SPACING IRRIGTN	18 CM	53 CM	MEAN
NONE	3.81	4.10	3.96
FULL	3.07	3.71	3.39
MEAN	3.44	3.91	3.67

SPACING FUNGTIME	18 CM	53 CM	MEAN
NEVER	3.27	3.43	3.35
ONCE	3.51	4.21	3.86
TWICE	3.55	4.08	3.81
MEAN	3.44	3.91	3.67

SPACING SEEDRATE	18 CM	53 CM	MEAN
126	3.02	3.68	3.35
378	3.86	4.14	4.00
MEAN	3.44	3.91	3.67

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77/R/BE/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGTIME	NEVER		ONCE		TWICE	
SEEDRATE	126	378	126	378	126	378
IRRIGTN						
NONE	3.17	3.93	3.44	4.36	3.86	4.99
FULL	3.02	3.29	3.81	3.83	2.81	3.60

FUNGTIME	NEVER		ONCE		TWICE	
SPACING	18 CM	53 CM	18 CM	53 CM	18 CM	53 CM
IRRIGTN						
NONE	3.40	3.70	3.88	3.91	4.15	4.70
FULL	3.15	3.16	3.13	4.50	2.94	3.47

SEEDRATE	126		378	
SPACING	18 CM	53 CM	18 CM	53 CM
IRRIGTN				
NONE	3.25	3.72	4.37	4.48
FULL	2.79	3.64	3.36	3.79

SEEDRATE	126		378	
SPACING	18 CM	53 CM	18 CM	53 CM
FUNGTIME				
NEVER	2.89	3.31	3.66	3.56
ONCE	3.20	4.04	3.81	4.38
TWICE	2.98	3.69	4.12	4.47

	SEEDRATE	126		378	
	SPACING	18 CM	53 CM	18 CM	53 CM
IRRIGTN	FUNGTIME				
NONE	NEVER	2.81	3.52	3.99	3.88
	ONCE	3.61	3.26	4.15	4.57
	TWICE	3.34	4.38	4.97	5.01
FULL	NEVER	2.96	3.09	3.33	3.24
	ONCE	2.80	4.82	3.47	4.19
	TWICE	2.61	3.00	3.27	3.94

GRAIN MEAN DM% 75.7

SUB PLOT AREA HARVESTED 0.00279

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/4

SPRING BEANS

APHIDS AND ENTOMOPHTHORA

Object: To study the effects of the fungus Entomophthora on aphid populations and yield of field beans - Geescroft.

Sponsor: N. Wilding.

Design: 5 randomised blocks of 5 plots.

Whole plot dimensions: 9.22 x 9.14.

Treatments:

TREATMNT	Control of insects and fungi:
NONE	None
INSCTCDE	Insecticide: Pirimicarb at 0.14 kg in 340 l on 4 July
FUNG C	Fungicide: Captafol at 1.4 kg on the first and third occasions and at 1.7 kg on the second, fourth and fifth occasions
FUNG M	Fungicide: Mancozeb at 1.3 kg on 5 occasions
ENTAPHID	Entomophthora spp. applied in live infected aphids on 20 June, 1977

NOTES: (1) Fungicides were applied in 340 l on 4 July, 14 July, 21 July, 27 July and 4 August.
(2) Yields were adjusted for a fertility trend across the site.

Basal applications: Manures: Chalk at 7.5 t. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 2 Sept, 1976. Ploughed: 9 Sept. Heavy spring-tine cultivated four times: 21 Sept, 22 Sept, 3 Nov, 8 Mar, 1977. Seed sown: 9 Mar. Weedkiller applied: 4 Apr. Combine harvested: 30 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Weekly assessments were made of aphid population density and proportion of infected aphids infected with entomophthora. Total above-ground dry matter was measured in August.

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/4

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	NONE	INSCTCDE	FUNG C	FUNG M	ENTAPHID	MEAN
	0.81	4.03	0.49	0.63	2.10	1.61

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT
SED	0.173

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.270	16.8

GRAIN MEAN DM% 80.2

PLOT AREA HARVESTED 0.00239

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/5

SPRING BEANS

CONTROL OF STEM EELWORM

Object: To study the effects of thiabendazole and aldicarb on stem eelworm (Ditylenchus dipsaci) and yield - Highfield O & E III.

Sponsor: D.J. Hooper.

Design: 3 randomised blocks of 8 plots

Whole plot dimensions: 2.54 x 9.14.

Treatments:

NEMACIDE	Nematicides:
NONE	None (Duplicated)
	Thiabendazole granules (kg a.i.) placed in the row at sowing:-
TH G 3	3
TH G 6	6
TH G 12	12
	Seed dressed with thiabendazole wettable powder (kg a.i.):-
TH S 2.7	2.7
TH S 5.4	5.4
	Aldicarb granules (kg a.i.) in the row at sowing:-
AL G 5	5

NOTE: Many germinating seeds were destroyed by pigeons. The inadvertent omission of weedkiller led to serious weed infestation. Damage from these two causes was so severe that one of the blocks had to be abandoned.

Basal applications: Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Ploughed: 7 Sept, 1976. Rotary cultivated: 5 Apr, 1977. Seed sown: 19 Apr. Tractor hoed: 20 June. Insecticide applied: 19 July. Combine harvested: 29 Sept. Previous crops: Beans 1975 and 1976.

NOTE: Stem height and numbers of stems infected with stem eelworm were assessed during the season. The percentage of infected seed was assessed after harvest.

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77/R/BE/5

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

NEMACIDE	
NONE	0.44
TH G 3	0.50
TH G 6	0.74
TH G 12	0.72
TH S 2.7	1.04
TH S 5.4	0.88
AL G 5	1.61
MEAN	0.80

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE	
SED	0.306	MIN REP
	0.265	MAX-MIN

	NEMACIDE
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.306	38.3

GRAIN MEAN DM% 66.8

PLOT AREA HARVESTED 0.00232

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77/R/BE/6

SPRING BEANS

DRILLS AND PLANT POPULATIONS

Object: To study the effects of precision sowing, seed rate and pathogen control on yields and incidence of pests and diseases - Pastures.

Sponsors: R. Bardner, A.J. Cockbain, J.M. Day, J.P. Dickinson, K.E. Fletcher, J. McEwen, R.J. Roughley, G.A. Salt, J.F. Witty.

Design: 2 randomised blocks of 2 plots split into 15 sub plots with a further 11 sub plots, for sampling only, duplicating certain of the treatments.

Whole plot dimensions: 8.23 x 119.

Treatments: All combinations of:-

Whole plots

1. PATHCONT — Pathogen control:

STANDARD	Standard, aphicide only
ENHANCED	Aldicarb to seedbed at 10 kg on 6 Apr, 1977 + aphicide

Sub plots

2. DRILL — Drills, plant spacings and populations:

	Drill	Spacing between rows	Spacing within rows	Target population	Population achieved
MF 18 4	Massey-Ferguson	18 cm (7 ins)	Random	500,000	524,000
MF 18 2	Massey-Ferguson	18 cm (7 ins)	Random	250,000	311,000
MF 53 4	Massey-Ferguson	53 cm (21 ins)	Random	500,000	398,000
MF 53 2	Massey-Ferguson	53 cm (21 ins)	Random	250,000	230,000
NG 36 4	Nodet-Gongis	36 cm (14 ins)	7.7 cm	500,000	408,000
NG 36 2	Nodet-Gongis	36 cm (14 ins)	15.4 cm	250,000	252,000
NG 53 4	Nodet-Gongis	53 cm (21 ins)	3.8 cm	500,000	103,000
NG 53 2	Nodet-Gongis	53 cm (21 ins)	7.7 cm	250,000	217,000
NG 53 1	Nodet-Gongis	53 cm (21 ins)	15.4 cm	125,000	213,000
ST 10 8	Stanhay	10 cm (4 ins)	9.9 cm	1,000,000	1,006,000
ST 10 6	Stanhay	10 cm (4 ins)	14.7 cm	750,000	717,000
ST 10 4	Stanhay	10 cm (4 ins)	19.8 cm	500,000	608,000
ST 10 2	Stanhay	10 cm (4 ins)	39.9 cm	250,000	346,000
ST 20 2	Stanhay	20 cm (8 ins)	19.8 cm	250,000	277,000
ST 20 1	Stanhay	20 cm (8 ins)	39.9 cm	125,000	156,000

NOTES: (1) On all plots of treatment DRILLS NG 53 4 the drill malfunctioned and yields are not presented.
(2) On one plot of treatment DRILLS MF 18 2 the drill malfunctioned. An estimated value was used in the analysis.
(3) Populations achieved with treatment DRILLS NG 53 1 were nearly double those intended.

Basal applications: Manures: Chalk at 7.5 t. FYM at 20 t. Weedkiller: Simazine at 0.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden.

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77/R/BE/6

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. FYM applied: 16 Sept. Ploughed: 17 Sept. Heavy spring-tine cultivated twice: 7 Mar, 1977. Spike rotary cultivated: 7 Apr. Seed sown: 21 Apr. Weedkiller applied: 9 May. Insecticide applied: 19 July. Combine harvested: 29 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Plant counts were made after establishment and again before harvest. Components of yield were measured before harvest. Nitrogenase activity of the roots was measured at monthly intervals. Incidence of Sitona, viruses and foliar fungi was measured at intervals through the season.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PATHCONT DRILL	STANDARD	ENHANCED	MEAN
MF 18 4	3.02	3.51	3.27
MF 18 2	1.84	3.61	2.72
MF 53 4	3.09	3.51	3.30
MF 53 2	2.42	2.90	2.66
NG 36 4	2.94	4.15	3.55
NG 36 2	2.95	3.40	3.18
NG 53 2	3.03	3.80	3.41
NG 53 1	2.78	3.36	3.07
ST 10 8	4.05	4.62	4.33
ST 10 6	3.83	3.87	3.85
ST 10 4	3.95	4.82	4.39
ST 10 2	3.52	3.67	3.59
ST 20 2	3.04	4.40	3.72
ST 20 1	2.69	3.34	3.02
MEAN	3.08	3.78	3.43

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	DRILL	PATHCONT* DRILL
SED	0.305	0.431

* WITHIN THE SAME LEVEL OF PATHCONT ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	25	0.431	12.6

GRAIN MEAN DM% 78.2

SUB PLOT AREA HARVESTED 0.00002

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77/R/BE/8

SPRING BEANS

SOIL INSECTICIDES AND SITONA CONTROL

Object: To study the effects of a range of soil-applied insecticides on the control of Sitona larvae and on yield - Pastures.

Sponsors: R. Bardner, K.E. Fletcher, D.C. Griffiths.

Design: 4 randomised blocks of 16 plots.

Whole plot dimensions: 2.67 x 4.27.

Treatments:

INSCTCDE	Insecticides (kg):	
NONE	None (2 plots per block)	
CARBOP 1	Carbophenothion	2.24
CARBOP 2	Carbophenothion	4.48
CHLORM 2	Chlormephos	4.48
CHLORM 4	Chlormephos	8.96
DIAZIN 1	Diazinon	2.24
DIAZIN 2	Diazinon	4.48
FONOF 2	Fonofos	4.48
FONOF 4	Fonofos	8.96
HCH 1	HCH (BHC)	2.24
HCH 2	HCH (BHC)	4.48
METHIO 1	Methiocarb	2.24
METHIO 2	Methiocarb	4.48
TRIAZO 1	Triazophos	2.24
TRIAZO 2	Triazophos	4.48

NOTE: Treatments applied on 5 Apr, 1977.

Basal applications: Manures: FYM at 20 t. Chalk at 7.5 t. Weedkiller: Simazine at 0.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 1 Sept, 1976. FYM applied: 16 Sept. Ploughed: 17 Sept. Heavy spring-tine cultivated: 7 Mar, 1977. Spike rotary cultivated: 5 Apr. Seed sown: 7 Apr. Weedkiller applied: 11 May. Insecticide applied: 19 July. Harvested by hand: 14 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Germination counts were made. Leaves and leaf notches were counted during the season. Sitona larvae were counted twice.

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/8

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	
NONE	3.30
CARBOP 1	3.28
CARBOP 2	3.49
CHLORM 2	3.07
CHLORM 4	3.44
DIAZIN 1	3.36
DIAZIN 2	3.28
FONOF 2	3.64
FONOF 4	3.35
HCH 1	3.51
HCH 2	3.20
METHIO 1	3.24
METHIO 2	3.42
TRIAZO 1	3.36
TRIAZO 2	3.31
MEAN	3.35

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INSCTCDE	
SED	0.227	MIN REP
	0.197	MAX-MIN

	INSCTCDE
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	46	0.321	9.6

GRAIN MEAN DM% 80.4

PLOT AREA HARVESTED 0.00059

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/11

SPRING BEANS

RED TICK LINES

Object: To compare agronomic characters and yields of several lines of red-seeded field beans with two standard white varieties - Long Hoos IV 6.

Sponsor: J. McEwen.

Design: 3 randomised blocks of 14 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY	Varieties:
RT1-RT11	Eleven red-seeded lines selected at Rothamsted
RT C	Bulk seed from red-seeded lines selected at P.B.I. Cambridge
BLAZE	Maris Blaze (white-seeded)
MINDEN	Minden (white-seeded)

NOTE: Seed was sown by hand in rows 61 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Manures: (0:14:28) at 940 kg. Chalk at 2.9 t. Insecticide: Permethrin at 0.15 kg in 340 l on two occasions.

Cultivations, etc.:- PK applied: 18 Nov, 1976. Chalk applied: 3 Dec. Ploughed: 14 Dec-18 Jan, 1977. Power harrowed: 5 Apr. Seed sown: 6 Apr. Insecticide applied: 18 May, 21 June. Harvested by hand: 11 Oct. Previous crops: Wheat 1975, swedes 1976.

NOTE: Plant counts were made after establishment and again before harvest. Flowering dates were recorded. Components of yield were measured before harvest.

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77/R/BE/11

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY	
RT1	4.01
RT2	3.98
RT3	3.94
RT4	4.03
RT5	3.98
RT6	3.87
RT7	4.19
RT8	4.25
RT9	4.08
RT10	3.97
RT11	3.76
RT C	3.61
BLAZE	4.37
MINDEN	3.89
MEAN	3.99

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY
SED	0.249

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.305	7.6

GRAIN MEAN DM% 75.0

PLOT AREA HARVESTED 0.00015

https://doi.org/10.23637/ERADOC-1-29

77/R/BE/14

SPRING BEANS

COMPARISON OF SPRAYERS

Object: To study the performance of an electrostatic spraying system on distribution of spray material and on yield of beans - Geescroft.

Sponsor: A.J. Arnold.

Design: 3 blocks of 2 plots split into 5.

Whole plot dimensions: 2.67 x 9.14.

Treatments: All combinations of:-

Whole plots:

1. SPRAYDAY	Dates of spraying:
1 JUNE	1 June for electrostatic sprayer, 30 May for farm sprayer
23 JUNE	23 June

Sub plots

2. SPRAYER	Sprayer used to apply permethrin at 0.07 kg:
NONE	None applied
EC 1 E	Electrostatic sprayer, spraying charged particles with a single rotary atomiser, sprayer earthed (SPRAYDAY 1 JUNE only)
EC 2 E	Electrostatic sprayer, spraying charged particles with two rotary atomisers, sprayer earthed
EC 2 -	Electrostatic sprayer, spraying charged particles with two rotary atomisers, sprayer not earthed (SPRAYDAY 23 JUNE only)
EU	Electrostatic sprayer, spraying uncharged particles
FU	Standard Farm sprayer, spraying uncharged particles

NOTES: (1) Farm sprayer applied permethrin in 560 l.
(2) Electrostatic sprayer applied permethrin in 31 l.

Basal applications: Manures: Chalk at 7.5 t. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 2 Sept, 1976. Ploughed: 9 Sept. Heavy spring-tine cultivated four times: 21 Sept, 22 Sept, 3 Nov, 8 Mar, 1977. Seed sown: 9 Mar. Weedkiller applied: 4 Apr. Combine harvested: 30 Sept. Previous crops: Wheat 1975, barley 1976.

NOTE: Observations were made on patterns of spray deposition.

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77/R/BE/14

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SPRAYER / SPRAYDAY	NONE	EC 1 E	EC 2 E	EC 2 -	EU	FU
1 JUNE	4.61	4.95	4.80		4.79	4.93
23 JUNE	4.11		4.62	4.72	4.44	4.44
GRAND MEAN	4.64					

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SPRAYDAY* SPRAYER
SED	0.184

* WITHIN THE SAME LEVEL OF SPRAYDAY ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	16	0.225	4.9

GRAIN MEAN DM% 81.6

SUB PLOT AREA HARVESTED 0.00244

https://doi.org/10.23637/ERADOC-1-29