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# Yields of the Field Experiments 1979

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## 79/R/BE/5 Factors Affecting Yield - Beans

### Rothamsted Research

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79/R/BE/5

SPRING BEANS

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on pests, diseases, nitrogen fixation and yield of field beans - Little Hoos.

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Design: Single replicate of  $2^6$  in 2 blocks of 2 plots split into 4 sub plots, split into 4 sub sub plots.

Whole plot dimensions: 22.6 x 10.5.

Treatments: All combinations of:-

Whole plots

- |             |                     |
|-------------|---------------------|
| 1. IRRIGATN | Irrigation:         |
| NONE        | None                |
| FULL        | Full (total 100 mm) |

Sub plots

- |            |            |
|------------|------------|
| 2. VARIETY | Varieties: |
| BLAZE      |            |
| MINDEN     |            |
- 
- |            |  |
|------------|--|
| 3. AL TRIS | Aluminium tris-ethyl phosphonate (kg) foliar spray on 14 June: |
| 0.0        |  |
| 2.0        |  |

Sub sub plots

- |             |                                    |
|-------------|------------------------------------|
| 4. ALDICARB | Aldicarb to seedbed (kg) on 1 May: |
| 0           |                                    |
| 10          |                                    |
- 
- |            |  |
|------------|--|
| 5. PERMETH | Permethrin foliar spray (kg) on 18 June: |
| 0.00       |  |
| 0.15       |  |
- 
- |            |                                      |
|------------|--------------------------------------|
| 6. BENOMYL | Benomyl foliar spray (kg) on 15 Aug: |
| 0.0        |                                      |
| 0.6        |                                      |

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- NOTES: (1) A planned test of benomyl + thiram seed dressing failed because of seed-flow problems with the dressed seed, this treatment was replaced by AL TRIS.
- (2) A planned test of conventional sowing versus precision sowing was abandoned because of extremely poor establishment with conventional sowing. All treatments presented were precision sown.
- (3) A planned test of pirimicarb applied early was abandoned because of late sowing and the need to apply basal pirimicarb twice to control *Aphis fabae*.
- (4) Irrigation was applied to reduce a deficit of 50 mm to 25 mm before pod set, and one of 80 mm to 55 mm after pod set (mm water):

2 July	25
6 July	25
10 July	25
23 July	<u>25</u>
Total	100

Basal applications: Weedkillers: Trietazine and simazine (as 'Rental SC' at 2.8 kg) in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l applied twice.

Seed: Sown at 500,000 seeds per hectare in rows 20 cm apart. For Blaze 230 kg seed, for Minden 260 kg.

Cultivations, etc.:— Ploughed: 13 Dec, 1978. Heavy spring-tine cultivated: 21 Apr, 1979. Rotary harrowed: 1 May. Seed sown: 9 May. Weedkillers applied: 14 May. Insecticide applied: 22 June and 13 July. Combine harvested: 16 Oct. Previous cropping: Wheat 1977 and 1978.

NOTE: Plant counts were made after establishment and components of yield measured before harvest. Nitrogenase activity was measured during the season. Ectoparasitic nematodes, root and foliar fungi, aphids, weevils and viruses were counted at intervals during the season. Nitrogen percentages of grain were measured.

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GRAIN TONNES/HECTARE

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

VARIETY	BLAZE	MINDEN	MEAN
IRRIGATN			
NONE	3.98	3.92	3.95
FULL	5.00	5.21	5.11
MEAN	4.49	4.56	4.53
AL TRIS	0.0	2.0	MEAN
IRRIGATN			
NONE	3.84	4.05	3.95
FULL	5.08	5.13	5.11
MEAN	4.46	4.59	4.53
AL TRIS	0.0	2.0	MEAN
VARIETY			
BLAZE	4.42	4.56	4.49
MINDEN	4.50	4.62	4.56
MEAN	4.46	4.59	4.53
ALDICARB	0	10	MEAN
IRRIGATN			
NONE	3.88	4.02	3.95
FULL	5.11	5.10	5.11
MEAN	4.50	4.56	4.53
ALDICARB	0	10	MEAN
VARIETY			
BLAZE	4.42	4.56	4.49
MINDEN	4.57	4.56	4.56
MEAN	4.50	4.56	4.53
ALDICARB	0	10	MEAN
AL TRIS			
0.0	4.44	4.49	4.46
2.0	4.55	4.63	4.59
MEAN	4.50	4.56	4.53
PERMETH	0.00	0.15	MEAN
IRRIGATN			
NONE	4.05	3.85	3.95
FULL	5.08	5.14	5.11
MEAN	4.56	4.49	4.53
PERMETH	0.00	0.15	MEAN
VARIETY			
BLAZE	4.51	4.47	4.49
MINDEN	4.61	4.52	4.56
MEAN	4.56	4.49	4.53

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GRAIN TONNES/HECTARE

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

PERMETH	0.00	0.15	MEAN	
AL TRIS				
0.0	4.52	4.41	4.46	
2.0	4.60	4.58	4.59	
MEAN	4.56	4.49	4.53	
PERMETH	0.00	0.15	MEAN	
ALDICARB				
0	4.56	4.43	4.50	
10	4.56	4.56	4.56	
MEAN	4.56	4.49	4.53	
BENQMYL	0.0	0.6	MEAN	
IRRIGATN				
NONE	3.85	4.05	3.95	
FULL	5.00	5.21	5.11	
MEAN	4.43	4.63	4.53	
BENQMYL	0.0	0.6	MEAN	
VARIETY				
BLAZE	4.33	4.65	4.49	
MINDEN	4.52	4.60	4.56	
MEAN	4.43	4.63	4.53	
BENQMYL	0.0	0.6	MEAN	
AL TRIS				
0.0	4.34	4.59	4.46	
2.0	4.51	4.67	4.59	
MEAN	4.43	4.63	4.53	
BENQMYL	0.0	0.6	MEAN	
ALDICARB				
0	4.45	4.54	4.50	
10	4.40	4.72	4.56	
MEAN	4.43	4.63	4.53	
BENQMYL	0.0	0.6	MEAN	
PERMETH				
0.00	4.43	4.69	4.56	
0.15	4.42	4.56	4.49	
MEAN	4.43	4.63	4.53	
VARIETY	BLAZE		MINDEN	
ALDICARB	0	10	0	10
IRRIGATN				
NONE	3.86	4.10	3.90	3.94
FULL	4.99	5.02	5.24	5.18



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GRAIN TONNES/HECTARE

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

AL TRIS	0.0		2.0	
ALDICARB	0	10	0	10
IRRIGATN				
NONE	3.71	3.98	4.05	4.06
FULL	5.17	5.00	5.06	5.20
AL TRIS	0.0		2.0	
ALDICARB	0	10	0	10
VARIETY				
BLAZE	4.41	4.43	4.44	4.68
MINDEN	4.46	4.55	4.67	4.57
VARIETY	BLAZE		MINDEN	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	4.05	3.90	4.04	3.80
FULL	4.97	5.04	5.19	5.24
AL TRIS	0.0		2.0	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	4.01	3.67	4.08	4.02
FULL	5.03	5.14	5.12	5.13
AL TRIS	0.0		2.0	
PERMETH	0.00	0.15	0.00	0.15
VARIETY				
BLAZE	4.40	4.44	4.62	4.50
MINDEN	4.64	4.37	4.59	4.66
ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
IRRIGATN				
NONE	3.99	3.77	4.11	3.93
FULL	5.14	5.09	5.01	5.18
ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
VARIETY				
BLAZE	4.50	4.35	4.52	4.59
MINDEN	4.63	4.51	4.60	4.52
ALDICARB	0		10	
PERMETH	0.00	0.15	0.00	0.15
AL TRIS				
0.0	4.55	4.33	4.49	4.48
2.0	4.58	4.53	4.63	4.63
VARIETY	BLAZE		MINDEN	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.84	4.12	3.86	3.98
FULL	4.82	5.19	5.19	5.23

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GRAIN TONNES/HECTARE

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

AL TRIS	0.0		2.0	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.70	3.99	4.00	4.11
FULL	4.98	5.19	5.03	5.23
AL TRIS	0.0		2.0	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.24	4.60	4.41	4.70
MINDEN	4.44	4.57	4.61	4.64
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.80	3.95	3.89	4.15
FULL	5.10	5.13	4.91	5.29
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.35	4.50	4.30	4.81
MINDEN	4.55	4.58	4.50	4.62
ALDICARB	0		10	
BENOMYL	0.0	0.6	0.0	0.6
AL TRIS				
0.0	4.39	4.49	4.29	4.68
2.0	4.52	4.59	4.51	4.75
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
IRRIGATN				
NONE	3.93	4.17	3.77	3.93
FULL	4.93	5.22	5.08	5.19
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
VARIETY				
BLAZE	4.29	4.73	4.37	4.57
MINDEN	4.57	4.66	4.48	4.55
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
AL TRIS				
0.0	4.32	4.72	4.36	4.45
2.0	4.54	4.67	4.48	4.67
PERMETH	0.00		0.15	
BENOMYL	0.0	0.6	0.0	0.6
ALDICARB				
0	4.51	4.62	4.39	4.46
10	4.35	4.77	4.45	4.66

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GRAIN TONNES/HECTARE

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

VARIETY	BLAZE		MINDEN	
AL TRIS	0.0	2.0	0.0	2.0
IRRIGATN				
NONE	3.80	4.16	3.88	3.95
FULL	5.04	4.96	5.12	5.30

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

TABLE	ALDICARB	PERMETH	BENOMYL	IRRIGATN* ALDICARB
SED	0.046	0.046	0.046	0.065

TABLE	VARIETY* ALDICARB	AL TRIS* ALDICARB	IRRIGATN* PERMETH	VARIETY* PERMETH
SED	0.065	0.065	0.065	0.065

TABLE	AL TRIS* PERMETH	ALDICARB PERMETH	IRRIGATN* BENOMYL	VARIETY* BENOMYL
SED	0.065	0.065	0.065	0.065

TABLE	AL TRIS* BENOMYL	ALDICARB BENOMYL	PERMETH+ BENOMYL	IRRIGATN* AL TRIS* ALDICARB
SED	0.065	0.065	0.065	0.092

TABLE	VARIETY* AL TRIS* ALDICARB	IRRIGATN* VARIETY* PERMETH	IRRIGATN* AL TRIS* PERMETH	VARIETY* AL TRIS* PERMETH
SED	0.092	0.092	0.092	0.092



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GRAIN TONNES/HECTARE

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

TABLE	IRRIGATN* ALDICARB PERMETH	VARIETY* ALDICARB PERMETH	AL TRIS* ALDICARB PERMETH	IRRIGATN* VARIETY* BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	IRRIGATN* AL TRIS* BENOMYL	VARIETY* AL TRIS* BENOMYL	IRRIGATN* ALDICARB BENOMYL	VARIETY* ALDICARB BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	AL TRIS* ALDICARB BENOMYL	IRRIGATN* PERMETH BENOMYL	VARIETY* PERMETH BENOMYL	ALDICARB* PERMETH BENOMYL
SED	0.092	0.092	0.092	0.092

TABLE	IRRIGATN* VARIETY* ALDICARB
SED	0.092

\* SED ONLY VALID FOR COMPARING MEANS WITH THE SAME LEVELS  
(COMBINATIONS) OF THE FACTORS MARKED WITH \*

+ SED NOT VALID FOR COMPARING MEANS WITH THE SAME LEVELS  
OF PERMETH OR BENOMYL

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP.SSP	18	0.185	4.1

GRAIN MEAN DM% 73.4

SUB PLOT AREA HARVESTED 0.00248