ROTHAMSTED RESEARCH

Yields of the Field Experiments 1990

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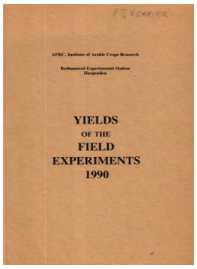

Navy Beans

Rothamsted Research

Rothamsted Research (1991) *Navy Beans ;* Yields Of The Field Experiments 1990, pp 153 - 158 **- DOI: https://doi.org/10.23637/ERADOC-1-42**

90/W/NB/1

NAVY BEANS

SEEDBED AND LATE N

Object: To study the effects of seedbed and late nitrogen fertilizer on the growth and yield of navy beans inoculated with Rhizobium - Woburn, Great Hill Bottom I.

Sponsors: J.M. Day, M.L. Lovell.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 1.5 x 6.0.

Treatments: All combinations of:-

1. **SD BED N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27% N), applied to seedbed:

   20
   40
   60

2. **APP METH** Methods of applying seedbed nitrogen fertilizer:

BCAST	Broadcast by hand after drilling
COM DRLL	Combine drilled with seed

3. **FLOWR N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk', applied at flowering on 28 June, 1990:

   0
   120

plus four extra treatments :

EXTRA

0 0 0	No nitrogen fertilizer (duplicated)
0 0 120F	120 kg N at flowering (duplicated)
120S 0 0	120 kg N broadcast to seedbed
120S 120F	120 kg broadcast to seedbed, repeated at flowering

Basal applications: Manures: (0:24:24) at 200 kg. Weedkillers: Paraquat at 0.80 kg ion in 220 l. Trifluralin at 0.84 kg in 220 l. Monolinuron at 0.56 kg in 220 l. Fungicide: Benomyl at 0.55 kg in 220 l. Irrigation: 24 mm (12 mm applied on two occasions).

Seed: Albion, sown at 40 seeds per square metre.

Cultivations, etc.:- Ploughed: 22 Nov, 1989. Paraquat applied: 3 May, 1990. PK applied: 18 May. Spring-tine cultivated: 21 May. Trifluralin applied and cultivated: 22 May. Seed sown and seedbed N treatments applied: 24 May. Monolinuron applied: 31 May. Irrigation applied: 1 and 20 June. Remaining N treatments applied: 28 June. Fungicide applied 22 Aug. Hand harvested and threshed by stationary combine harvester: 27 Oct. Previous crops: S. wheat 1988, s. barley 1989.

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NOTE: Times of flowering were noted:

GRAIN (AT 85% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

APP METH	BCAST	COM DRLL	Mean
SD BED N			
20	2.19	2.30	2.25
40	1.99	1.99	1.99
60	2.16	2.02	2.09
Mean	2.11	2.10	2.11

FLOWR N	0	120	Mean
SD BED N			
20	2.17	2.33	2.25
40	2.19	1.78	1.99
60	2.21	1.97	2.09
Mean	2.19	2.03	2.11

FLOWR N	0	120	Mean
APP METH			
BCAST	2.13	2.09	2.11
COM DRLL	2.25	1.96	2.10
Mean	2.19	2.03	2.11

APP METH	BCAST		COM DRLL	
SD BED N FLOWR N	0	120	0	120
20	1.97	2.41	2.36	2.24
40	2.17	1.81	2.22	1.76
60	2.26	2.06	2.17	1.88

EXTRA	0 0 0	0 0 120F	120S 0 0	120S 120F	Mean
	2.29	2.11	2.32	2.39	2.25

GRAND MEAN 2.16

*** Standard errors of differences of means ***

SD BED N	APP METH	FLOWR N	SD BED N APP METH	
0.173	0.141	0.141	0.245	

SD BED N FLOWR N	APP METH FLOWR N	SD BED N APP METH FLOWR N	EXTRA	
0.245	0.200	0.347	0.347	min.rep
			0.300	max-min
			0.245	max.rep

EXTRA	
min.rep	120S 0 0 v 120S 120F
max-min	0 0 0 or 0 0 120F v 120S 0 0 or 120S 120F
max.rep	0 0 0 v 0 0 120F

GRAIN MEAN DM% * PLOT AREA HARVESTED 0.00045

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90/W/NB/2

NAVY BEANS

VARIETIES, RHIZOBIUM AND N

Object: To study the responses of five varieties of navy beans to Rhizobium inoculation and nitrogen fertilizer - Woburn, Great Hill Bottom I.

Sponsors: J.M. Day, M.L. Lovell.

Design: 3 randomised blocks of 80 plots.

Whole plot dimensions: 1.5 x 3.0.

Treatments: All combinations of:-

1. **VARS IT** Varieties used in inoculation test:

   ALBION
   EDMUND
   SAJA X1
   SAJA X2
   SEAFARER

2. **INOCULUM** Inoculants of Rhizobium phaseoli applied as granules with the seed:

NONE	
I 1	RCR 3622
I 2	RCR 3639
I 3	CIAT 274
I 4	CIAT 632
I 5	PGRO 1

3. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk' to seedbed:

   0
   40

together with all combinations of:-

1. **VARS NT** Varieties, uninoculated, used in nitrogen test:

   ALBION
   EDMUND
   SAJA X1
   SAJA X2
   SEAFARER

2. **N R T** Nitrogen rates (kg N) as 'Nitro-Chalk' and times:

80 S	80 broadcast to seedbed
120 S	120 broadcast to seedbed
160 S	160 broadcast to seedbed
160S+80F	160 broadcast to seedbed + 80 at flowering

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90/W/NB/2

Basal applications: Manures: (0:24:24) at 200 kg. Weedkillers: Paraquat at 0.80 kg ion in 220 l. Trifluralin at 0.84 kg in 220 l. Monolinuron at 0.56 kg in 220 l. Fungicide: Benomyl at 0.55 kg in 220 l. Irrigation 24 mm: (12 mm applied on two occasions).

Seed: Sown at 40 seeds per square metre.

Cultivations, etc.:- Ploughed: 22 Nov, 1989. Paraquat applied: 3 May, 1990. PK applied: 18 May. Spring-tine cultivated: 21 May. Trifluralin applied and cultivated: 22 May. Seed sown: 23 May. Seedbed N applied: 24 May. Monolinuron applied: 31 May. Irrigation applied: 1 and 20 June. Fungicide applied: 22 Aug. Hand harvested and threshed by stationary combine harvester: 27 Oct. Previous crops: S. wheat 1988, s. barley 1989.

NOTES: (1) Times of flowering were noted.
(2) 19 plots failed to mature enough for combine harvesting and the yields were lost, those with treatment combinations

VARS IT	ALBION	SEAFARER	ALBION	SEAFARER	ALBION	ALBION
INOCULUM	I 2	I 3	I 4	I 1	I 3	NONE
N	0	40	0	40	40	40

VARS IT	SAJA X1	SEAFARER	SAJA X2	ALBION	SAJA X1
INOCULUM	NONE	I 4	I 2	I 5	I 2
N	40	40	0	40	0

VARS NT	SEAFARER	EDMUND	SAJA X2	SAJA X1
N R T	160S+80F	80 S	120 S	160S+80F

VARS NT	SEAFARER	SAJA X2	ALBION	SEAFARER
N R T	160 S	160S+80F	160S+80F	80 S

Estimated values were used in the analysis.

GRAIN (AT 85% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

INOCULUM	NONE	I 1	I 2	I 3	I 4	I 5	Mean
VARS IT							
ALBION	2.75	2.76	2.82	2.65	3.04	2.51	2.75
EDMUND	2.97	2.76	3.06	2.27	2.60	2.93	2.77
SAJA X1	2.18	2.26	2.02	1.91	2.03	1.90	2.05
SAJA X2	2.21	2.39	2.50	2.29	2.70	2.80	2.48
SEAFARER	3.09	2.85	2.72	2.78	2.82	3.07	2.89
Mean	2.64	2.60	2.63	2.38	2.64	2.64	2.59

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GRAIN (AT 85% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

N	0	40	Mean
VARS IT			
ALBION	2.76	2.75	2.75
EDMUND	2.72	2.81	2.77
SAJA X1	1.98	2.13	2.05
SAJA X2	2.40	2.57	2.48
SEAFARER	2.85	2.92	2.89
Mean	2.54	2.64	2.59

N	0	40	Mean
INOCULUM			
NONE	2.51	2.77	2.64
I 1	2.48	2.72	2.60
I 2	2.53	2.72	2.63
I 3	2.44	2.32	2.38
I 4	2.61	2.67	2.64
I 5	2.67	2.62	2.64
Mean	2.54	2.64	2.59

N		0	40
VARS IT	INOCULUM		
ALBION	NONE	2.48	3.02
	I 1	2.53	2.98
	I 2	2.69	2.95
	I 3	2.98	2.32
	I 4	3.11	2.97
	I 5	2.75	2.27
EDMUND	NONE	2.96	2.99
	I 1	2.62	2.89
	I 2	2.76	3.37
	I 3	2.37	2.17
	I 4	2.49	2.70
	I 5	3.11	2.75
SAJA X1	NONE	1.88	2.48
	I 1	2.17	2.34
	I 2	2.16	1.88
	I 3	1.79	2.04
	I 4	2.06	2.01
	I 5	1.80	2.01
SAJA X2	NONE	2.20	2.22
	I 1	2.31	2.48
	I 2	2.38	2.62
	I 3	2.35	2.22
	I 4	2.41	3.00
	I 5	2.74	2.86
SEAFARER	NONE	3.03	3.15
	I 1	2.79	2.90
	I 2	2.64	2.80
	I 3	2.73	2.83
	I 4	2.98	2.65
	I 5	2.93	3.21

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GRAIN (AT 85% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

N R T VARS NT	80 S	120 S	160 S	160S+80F	Mean
ALBION	2.58	2.67	2.64	2.51	2.60
EDMUND	2.70	3.26	2.92	2.42	2.83
SAJA X1	2.26	1.55	1.68	2.18	1.92
SAJA X2	2.45	2.37	2.02	2.47	2.33
SEAFARER	3.17	2.40	2.65	3.44	2.92
Mean	2.63	2.45	2.38	2.61	2.52

GRAND MEAN 2.57

*** Standard errors of differences of means ***

INOCULUM	VARS IT	N	VARS NT
0.107	0.098	0.062	0.169

N R T	INOCULUM VARS IT	N VARS IT	N INOCULUM
0.151	0.239	0.138	0.151

N R T VARS NT	INOCULUM VARS IT N
0.338	0.338

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	153	0.414	16.1

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00045

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