ROTHAMSTED RESEARCH

Yields of the Field Experiments 1973

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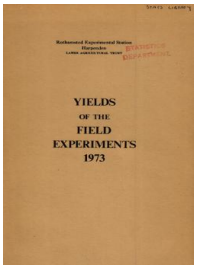

Beans

Rothamsted Research

Rothamsted Research (1974) *Beans ;* Yields Of The Field Experiments 1973, pp 346 - 367 **- DOI: https://doi.org/10.23637/ERADOC-1-98**

73/R/BE/1

WINTER BEANS

VIRUS CONTROL

Object: To study the effects of heat treatment of seed, roguing and control of weevil vectors on yield and incidence of Broad Bean Stain and Broad Bean True Mosaic Viruses in field beans - Pastures.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 4.27 x 15.2. Area harvested: 0.00650.

Treatments: Virus control:

	VRUSCONT
None	0
Seed heat treated (4 days at 55-60 C), crop rogued	HR
Seed not heat treated, crop rogued	R
Seed heat treated, crop rogued and sprayed with gamma BHC	HRS
Seed not heat treated, crop rogued and sprayed with gamma BHC	RS

Roguing was done on 11 Dec, 1972, 23 Mar, 1973, 27 Apr, 31 May. Insecticide treatment spray was 0.28 kg gamma BHC in 340 l on 23 Mar, repeated on 6 June.

Basal applications: Manures: (0:14:28) at 400 kg, placement drilled.

Seed: Throws MS sown at 350 kg.

Cultivations, etc.:- Ploughed: 23 Sept, 1972. Rotary harrowed: 2 Oct. Seed sown: 6 Oct. Tractor hoed: 19 Apr and 3 May, 1973. Combine harvested: 23 Aug. Previous crops: Barley 1971, barley 1972.

NOTES: (1) Plant populations were determined on 21 Mar. Incidence of viruses was assessed on 11 Dec and 7 July. Adult weevil damage was assessed on 14 Dec, 21 Mar and 16 Apr. Adult weevil populations were assessed on 7 June. Seed samples were taken at harvest for assessment of virus infection.

(2) Owing to a blockage during combining, yields from two plots (treatments HR and HRS) were not recorded. Estimated values were used in the analysis.

Standard error per plot.
Grain, tonnes/hectare: 0.300 or 9.6% (10 d.f.)

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VRUSCONT

0	HR	R	HRS	RS	Mean
2.89	3.27	3.07	3.25	3.15	3.12

STANDARD ERROR OF DIFFERENCES

VRUSCONT

0.212

Mean D.M. % 85.7

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/3

SPRING BEANS

VIRUS CONTROL

Object: To study the effects of heat treatment of seed, roguing and control of weevil vectors on yield and incidence of Broad Bean Stain and Broad Bean True Mosaic Viruses in field beans - Great Knott II.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 4.27 x 15.2. Area harvested: 0.00650.

Treatments: Virus control:

	VRUSCONT
None	0
Seed heat treated (4 days at 55-60°C), crop rogued	HR
Seed not heat treated, crop rogued	R
Seed heat treated, crop rogued and sprayed with gamma BHC	HRS
Seed not heat treated, crop rogued and sprayed with gamma BHC	RS

The heat treated seed failed to germinate. Roguing was done on 4, 25 May, 7 June. (Roguing was abandoned on 29 June as too many plants infected.) Insecticide treatment spray was 0.28 kg gamma BHC applied in 340 l on 6 June, repeated on 3 July.

Basal applications: Manures: Ground chalk at 7.5 tonnes, (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Seed sown: 14 Mar, 1973. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Incidence of viruses was assessed on 29 June and 25 July. Adult weevil populations were assessed on 7 June. Seed samples were taken at harvest for assessment of virus infection.

Standard error per plot.
Grain, tonnes/hectare: 0.406 or 8.7% (6 d.f.)

https://doi.org/10.23637/ERADOC-1-98

73/P/BE/3

TABLES OF MEANS

CROP: TONNES/HECTARE

VRUSCONT

O	R	R3	Mean
4.53	4.49	4.93	4.65

STANDARD ERROR OF DIFFERENCES

VRUSCONT

0.287

Mean D.M. % 82.9

https://doi.org/10.23637/ERADOC-1-98

73/R/2E/4

SPRING BEANS

VARIETIES AND VIRUSES

Object: To study the spread and effects on yield of Broad Bean Stain and Broad Bean True Mosaic Viruses in different varieties of field beans - Great Knott II.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 6.40 x 15.2. **Area harvested:** 0.00488.

Treatments: Varieties

	VARIETY
Hertz Freya	Freya
Maris Bead	Bead
Minden	Minden
Minor	Minor

Basal applications: Manures: Ground chalk at 7.5 tonnes, (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 0.84 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 12-21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Seed sown and weedkiller applied: 23 Mar, 1973. Insecticide applied: 8 June. Combine harvested: 4 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Incidence of viruses was assessed on 9, 25 May, 7, 29 June, 17 July. Adult weevil damage was assessed on 17 May. Seed samples were taken at harvest for assessment of virus infection.

Standard error per plot.
Grain, tonnes/hectare: 0.290 or 8.2% (9 d.f.)

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/4

TABLES OF MEANS

GRAIN: TONNES/HECTARE

VARIETY

Freya	Bead	Minden	Minor	Mean
3.58	3.10	4.05	3.51	3.56

STANDARD ERROR OF DIFFERENCES

VARIETY

0.205

Mean D.M. % 80.5

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73/R/BE/5

SPRING BEANS

CONTROL OF PESTS AND DISEASES

Object: To study the effects of a range of chemicals on pest and disease incidence and yield of beans using a seed stock infected with seed-borne viruses and not isolated from other bean crops (see also 73/R/CS/95) - Great Knott II.

Sponsors: R. Bardner, A.J. Cockbain, D. Hornby, G.A. Salt.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 6.40 x 19.2. Area harvested: 0.00615.

Treatments: Chemicals (kg):

	CHEMICAL
None	None
Aldicarb nematicide/insecticide, 4.5 applied as granules	Aldicarb
Gamma BHC insecticide, 2.2 in 290 l	BHC
Dexon fungicide, 78.5 in 290 l	Dexon
Dieldrin insecticide, 2.2 in 290 l	Dieldrin

Basal applications: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn to area not treated in 1971. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Treatments applied and all plots rotary cultivated: 12 Mar, 1973. Seed sown: 13 Mar. Weedkiller applied: 16 Mar. Insecticide applied: 8 June. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

https://doi.org/10.23637/ERADOC-1-98

NOTE: The following observations were made:-

(1) Incidence of viruses.
(2) Adult weevil populations.
(3) Damage to plants by adult weevils.
(4) Incidence of wilt.
(5) Incidence of Aphis fabae.
(6) Root health.
(7) Sitona larvae in soil.

Standard error per plot.
Grain, tonnes/hectare: 0.391 or 11.8% (12 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

CHEMICAL

None	Aldicarb	BHC	Dexon	Dieldrin	Mean
3.18	3.61	3.33	3.10	3.32	3.31

STANDARD ERROR OF DIFFERENCES

CHEMICAL

0.277

Mean D.M. % 81.9

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73/R/BE/6

SPRING BEANS

ALDICARB AND CROP HEALTH

Object: To study the yield and incidence of viruses and stem eelworm in two varieties of field beans grown with and without aldicarb in 1972 and the effects of fresh treatment in 1973 - Great Knott II.

Sponsors: A.J. Cockbain, D.J. Hooper, J. McEwen.

Design: 3 randomised blocks of 4 plots, split into 2.

Whole plot dimensions: 6.40 x 19.2. Sub plot area harvested: 0.00293.

Treatments: All combinations of:-

Whole plots:	1. Varieties	VARIETY
	Maris Bead	Bead
	Minor	Minor
	2. Aldicarb in 1972 (kg)	ALDICARB(72)
	None	0.0
	4.5	4.5
Sub plots:	3. Aldicarb in 1973 (kg)	ALDICARB(73)
	None	0.0
	5.0	5.0

Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg, Epsom salts at 900 kg - autumn 1972 to the area which did not receive this dressing in autumn 1971. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l. Insecticide: Demeton-s-methyl at 0.25 kg in 370 l.

Seed: Sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Aldicarb applied, rotary cultivated, seed sown: 13 Mar, 1973. Weedkiller applied: 16 Mar. Insecticide applied: 8 June. Combine harvested: 4 Sept. Previous crops: Winter wheat 1971, barley 1972.

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NOTES: (1) Adult weevil damage was assessed on 4 May and populations on 14 June. Incidence of viruses was assessed on 25 May, 29 June and 24 July.
(2) Counts of stems showing symptoms of attack by stem eelworm were made in August on the variety Maris Bead.

Standard errors per plot. Grain, tonnes/hectare.
Whole plot: 0.338 or 9.3% (6 d.f.)
Sub plot: 0.737 or 20.2% (8 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	ALDICARB(72)		ALDICARB(73)		
	0.0	4.5	0.0	5.0	Mean
VARIETY					
Bead	3.31	3.24	2.63	3.91	3.27
Minor	3.93	4.10	4.01	4.02	4.01
ALDICARB(72)					
0.0			3.34	3.90	3.62
4.5			3.31	4.03	3.67
Mean			3.32	3.96	3.64

ALDICARB(72)	0.0		4.5	
ALDICARB(73)	0.0	5.0	0.0	5.0
VARIETY				
Bead	2.85	3.76	2.42	4.06
Minor	3.83	4.03	4.19	4.01

https://doi.org/10.23637/ERADOC-1-98

STANDARD ERRORS OF DIFFERENCES

VARIETY	ALDICARB(72)	ALDICARB(73)	VARIETY ALDICARB(72)	VARIETY ALDICARB(73)	ALDICARB(72) ALDICARB(73)	VARIETY ALDICARB(72) ALDICARB(73)
0.195	0.195	0.301	0.276	0.358	0.358	0.507

Except when comparing means with same level of

VARIETY		0.425	
ALDICARB(72)			0.425
VARIETY.ALDICARB(72)			0.602

Mean D.M. % 81.4

73/R/BE/7

SPRING BEANS

EFFECTS OF APHIDS

Object: To study the effects of applying liquid or granular insecticides at different times on yield and aphid control - Great Knott II.

Sponsors: R. Bardner, J.H. Stevenson, K.E. Fletcher.

Design: 5 randomised blocks of 6 plots.

Whole plot dimensions: 5.34 x 12.2. Area harvested: 0.00390.

Treatments: Insecticides:-

	INSCTCDE
None	0
Phorate at 1.12 kg as granules:	
At start of flowering, 7 June	PGE
At end of flowering, 9 July	PGL
Demeton-s-methyl at 0.25 kg in 370 l:	
At start of flowering, 6 June	DSE
At end of flowering, 9 July	DSL
At start and again at end of flowering	DSEL

Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:20:20) at 1300 kg and Epsom salts at 900 kg to part which did not receive this dressing in 1970. (0:14:28) at 400 kg, placement drilled. Weedkiller: Simazine at 1.1 kg in 220 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- PK applied: 21 Sept, 1972. Epsom salts applied: 22 Sept. Chalk applied: 25 Sept. Ploughed: 22 Nov. Spring-tine cultivated: 8 Mar, 1973. Seed sown: 9 Mar. Weedkiller applied: 16 Mar. Combine harvested: 3 Sept. Previous crops: Winter wheat 1971, barley 1972.

NOTE: Aphid counts were made throughout the season.

Standard error per plot.
Grain, tonnes/hectare: 0.375 or 9.3% (20 d.f.)

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73/R/BE/7

TABLES OF MEANS

GRAIN: TONNES/HECTARE

INSCTCDE

0	PGE	PGL	DSE	DSL	DSEL	Mean
3.70	4.38	3.65	4.21	3.90	4.27	4.02

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.237

Mean D.M. % 83.7

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/9

SPRING BEANS

INSECTICIDES AND BENEFICIAL INSECTS

Object: To study the effect of two insecticides on beneficial insects, particularly predators and parasites of aphids, and the yield of field beans - Pastures.

Sponsor: J.H. Stevenson.

Design: Small plots: 2 randomised blocks of 3 plots.
Large plots: 3 randomised blocks of 3 plots.

Whole plot dimensions: Small plots: 17.1 x 21.3. Area harvested: 0.00293
Large plots: 36.3 x 36.6. Area harvested: 0.00585

Treatments:	PLOTSIZE
One experiment with small plots	Small
One experiment with large plots	Large

Treatments identical on both experiments:-

Insecticidal sprays just before flowering, 26 June:	INSCTCDE
None	None
Dimethoate 0.34 l in 740 l	Dimeth
Menazon 0.28 kg in 740 l	Menazon

Basal applications: Manures: (0:20:20) at 1300 kg, Epsom salts at 900 kg, broadcast in autumn. (0:14:28) at 400 kg, placement drilled.
Weedkillers: Paraquat at 0.42 kg ion in 220 l, and simazine at 1.1 kg in 220 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- Autumn PK applied: 11 Sept, 1972. Epsom salts applied: 20 Sept. Ploughed: 23 Sept. Paraquat applied: 28 Nov. Seed sown: 10 Mar, 1973. Simazine applied: 13 Mar. Combine harvested: 5 Sept. Previous crops: Barley 1971 and 1972.

NOTE: Aphid counts (Aphis fabae), sweep net samples of insects and samples for insects using portable insect suction sampler were made throughout the season. Carabid beetle samples from pit fall traps were taken just before and for 5 weeks after spraying. Water traps for insects were maintained in the crop during the latter part of the season.

Standard error per plot. PLOTSIZE Large.
Grain, tonnes/hectare: 0.219 or 6.3% (4 d.f.)

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TB/A/[illegible]/9

TABLES OF MEANS

GRAIN: [illegible]/HECTARE

	INSCTCDE			
	None	Dimeth	Menazon	Mean
PLOTSIZE				
Small	3.82	3.54	3.86	3.74
Large	2.96	3.71	3.79	3.49

STANDARD ERROR OF DIFFERENCES PLOTSIZE Large

INSCTCDE

0.179

Mean D.M. % 82.8

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/10

SPRING BEANS

EFFECTS OF HEAT TREATMENTS

Object: To study the effects of a range of heat treatments of seed on germination, incidence of seed borne viruses and yield of beans - Garden Plot 2.

Sponsor: A.J. Cockbain.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 2.03 x 10.7. Area harvested: 0.00108.

Treatments: Heat treatment of seed:

	HEATTRMT
None	None
Seed kept for 2 days at 60°C	2Day60
Seed kept for 4 days at 60°C	4Day60
Seed kept for 8 days at 60°C	8Day60
Seed kept for 2 days at 65°C	2Day65
Seed kept for 4 days at 65°C	4Day65
Seed kept for 8 days at 65°C	8Day65

Basal applications: Manures: (0:20:20) at 780 kg. Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl at 0.25 kg in 290 l.

Seed: Maris Bead, sown at 220 kg.

Cultivations, etc.:- PK fertiliser applied: 24 Nov, 1972. Ploughed: 30 Nov. Rotary cultivated and seed sown: 29 Mar, 1973. Weedkiller applied: 3 Apr. Insecticide applied: 26 June. Combine harvested: 7 Sept. Previous crops: Winter wheat 1971, potatoes 1972.

NOTES: (1) Seedling emergence counts were made and virus infection assessed on 29 May.
(2) Some treatments killed most seeds. Yields were taken only from 'None', '2Day60' and '2Day65'.

Standard error per plot.
Grain, tonnes/hectare: 0.343 or 18.2% (6 d.f.)

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73/R/BE/10

TABLE OF MEANS

GRAIN: TONNES/HECTARE

HEATTRMT

None	2Day60	2Day65	Mean
3.00	1.44	1.21	1.89

STANDARD ERROR OF DIFFERENCES

HEATTRMT

0.242

Mean D.M. % 80.2

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/11

SPRING BEANS

IRRIGATION, N AND CARBOHYDRATE

Object: To study the effects of nitrogen fertiliser, sucrose and irrigation applied at flowering time, on yield and its components in field beans - Long Hoos VI.

Sponsor: J. McEwen.

Design: 4 randomised blocks of 2 plots split into 6.

Whole plot dimensions: 2.03 x 3.05. Area harvested: 0.00019.

Treatments: All combinations of:-

Whole plots:	1.	Irrigation (mm of water, applied during 3-week flowering period)	IRRIGN
		None	0
		11	11
Sub plots:	2.	Nitrogen fertiliser (kg N) just before flowering, 7 June	N
		None	0
		150	150
	3.	Sucrose (kg) divided equally between three foliar sprays during flowering	SUCROSE
		None	0
		150	150
		450	450

Irrigation: 3 mm on 16 June, 8 mm on 20 June. Sucrose was applied in 1000 l: 10, 17 and 30 June.

Basal applications: Manures: (0:20:20) at 780 kg. Weedkiller: Simazine at 0.84 kg in 340 l. Insecticide: Demeton-s-methyl 0.25 kg in 290 l. Fungicide: Benomyl at 1.5 kg in 1000 l (applied with sucrose on plots receiving it).

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- PK applied: 29 Nov, 1972. Ploughed: 18 Dec. Power harrowed, seed sown: 12 Mar, 1973. Insecticide applied: 6 June. Benomyl applied: 10 June. Hand harvested: 12 Sept. Previous crops: Maize 1971, fallow 1972.

https://doi.org/10.23637/ERADOC-1-98

NOTE: Counts were made of the numbers of stems and pods. 1000 grain weights and % N in grain were measured.

Standard error per sub plot.
Grain, tonnes/hectare: 0.315 or 5.9% (30 d.f.)

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/11

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	N		SUCROSE			
	0	150	0	150	450	Mean
IRRIGN						
0	5.18	5.66	5.70	5.51	5.05	5.42
11	5.28	5.24	5.20	5.29	5.30	5.26
		N				
		0	5.34	5.24	5.10	5.23
		150	5.56	5.55	5.24	5.45
Mean			5.45	5.40	5.17	5.34

N		0			150	
SUCROSE	0	150	450	0	150	450
IRRIGN						
0	5.48	5.31	4.74	5.92	5.71	5.36
11	5.20	5.17	5.47	5.20	5.40	5.13

STANDARD ERRORS OF DIFFERENCES

N	SUCROSE	IRRIGN* N	IRRIGN* SUCROSE	N SUCROSE	IRRIGN* N SUCROSE
0.091	0.111			0.157	
Except when comparing means with same level of IRRIGN		0.128	0.157		0.222

* Within the same level of IRRIGN only

Mean D.M. % 85.3

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73/R/BE/12

SPRING BEANS

CONTROL OF WEEVILS

Object: To study the effect of some insecticides on the incidence of adult weevils and on yield of field beans - Pastures.

Sponsors: A.J. Cockbain, P. Etheridge.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 16.5 x 18.3. Area harvested: 0.00293.

Treatments: Insecticides (kg):

	INSCTCDE
None	None
Gamma BHC, 0.5 as spray	BHC
Fenitrothion, 0.75 as spray	Fenitro
Malathion, 1.0 as spray	Malathio
Methomyl, 1.0 as spray	Methomyl
Phorate, 1.0 as granules	Phorate

Sprays were applied on 31 May, in 670 l, and were repeated on 23 June, in 450 l. Granules were applied on 1 June, repeated on 25 June.

Basal applications: Manures: (0:20:20) at 1300 kg, Epsom salts at 900 kg in autumn. (0:14:28) at 400 kg, placement drilled. Weedkillers: Paraquat at 0.42 kg ion in 220 l, simazine at 1.1 kg in 220 l.

Seed: Minor, sown at 220 kg.

Cultivations, etc.:- Autumn PK and Epsom salts applied: 20 Sept, 1972. Ploughed: 5 Oct. Paraquat applied: 28 Nov. Seed sown: 10 Mar, 1973. Simazine applied: 13 Mar. Combine harvested: 5 Sept. Previous crops: Barley 1971, barley 1972.

NOTE: Adult weevil populations were assessed 1, 2, 4, 8, 12, 16 and 20 days after first spray treatment and 2, 10, 20 days after second treatment. Black aphid populations were assessed on 2 July and green aphid on 4 July.

Standard error per plot.
Grain, tonnes/hectare: 0.360 or 8.6% (10 d.f.)

https://doi.org/10.23637/ERADOC-1-98

73/R/BE/12

TABLE OF MEANS

GRAIN: TONNES/HECTARE

INSCTCDE

None	BHC	Fenitro	Malathio	Methomyl	Phorate	Mean
3.36	4.35	4.62	4.16	4.28	4.29	4.18

STANDARD ERROR OF DIFFERENCES

INSCTCDE

0.294

Mean D.M. % 83.4

https://doi.org/10.23637/ERADOC-1-98