ROTHAMSTED RESEARCH

Yields of the Field Experiments 1984

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Potatoes

Rothamsted Research

Rothamsted Research (1985) *Potatoes ;* Yields Of The Field Experiments 1984, pp 326 - 339 **- DOI: https://doi.org/10.23637/ERADOC-1-32**

84/R/P/1

POTATOES

VARIETIES AND STEM CANKER

Object: To study the effects of stem canker (Rhizoctonia solani) on plant growth and yield of a range of early and maincrop potato varieties using chitted and unchitted seed - Gt. Knott II.

Sponsors: G.A. Hide, P.J. Read, J.P. Sandison.

Design: Early varieties: 3 randomised blocks of 20 plots.
Maincrop varieties: 3 randomised blocks of 28 plots.

Whole plot dimensions: 3.0 x 10.7.

Treatments:

To EARLY varieties, all combinations of:-

1.	VARIETY	Varieties:
	A COMET	Arran Comet
	ESTIMA	Estima
	M PEER	Maris Peer
	U PRINCE	Ulster Prince
	U SCEPTR	Ulster Sceptre
2.	INOCULUM	Inoculum to seed at planting:
	NONE	None
	RHIZOCT	R. solani inoculum
3.	SD TREAT	Seed treatment:
	NONE	
	CHITTED	

To MAINCROP varieties, all combinations of:-

1.	VARIETY	Varieties:
	CARA	Cara
	DESIREE	Desiree
	K EDWARD	King Edward
	M PIPER	Maris Piper
	P CROWN	Pentland Crown
	P SQUIRE	Pentland Squire
	RECORD	Record
2.	INOCULUM	Inoculum to seed at planting:
	NONE	None
	RHIZOCT	R. solani inoculum

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3. SD TREAT Seed treatment:

NONE
CHITTED

NOTE: Rhizoctonia inoculum was grown on horticultural vermiculite and sprinkled over seed tubers at planting before covering.

Basal applications: Manures: FYM at 45 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 500 l. Fungicide: Fentin hydroxide at 0.28 kg in 200 l on seven occasions, applied with the insecticide on the first and third occasion. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.56 kg ion in 200 l.

Cultivations, etc:- Subsoiled, tines 45 cm deep, 76 cm apart: 6 Oct, 1983. FYM applied: 4 Nov. Ploughed: 9 Nov. NPK Mg applied, heavy spring-tine cultivated: 23 Mar, 1984. Rotary harrowed: 10 Apr. Early potatoes planted by hand: 11 Apr. Maincrop potatoes planted by hand: 12 Apr. Weedkillers applied: 4 May. Fungicide with insecticide applied: 19 June, 17 July. Fungicide alone applied: 3 July, 30 July, 13 Aug, 28 Aug, 11 Sept. Haulm desiccant applied: 4 Oct. Lifted: 16 Oct. Previous crops: S. barley 1982, w. oats 1983.

NOTE: Plant samples were taken on four occasions to assess stem canker, weight of foliage and weight and numbers of tubers.

https://doi.org/10.23637/ERADOC-1-32

84/R/P/1 EARLY POTATOES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM	NONE	RHIZOCT	MEAN
VARIETY			
A COMET	24.3	22.5	23.4
ESTIMA	33.3	30.8	32.1
M PEER	20.3	17.2	18.7
U PRINCE	19.8	16.9	18.3
U SCEPTR	22.1	19.3	20.7
MEAN	24.0	21.3	22.7

SD TREAT	NONE	CHITTED	MEAN
VARIETY			
A COMET	23.9	23.0	23.4
ESTIMA	32.4	31.7	32.1
M PEER	17.7	19.8	18.7
U PRINCE	18.0	18.6	18.3
U SCEPTR	20.3	21.2	20.7
MEAN	22.5	22.8	22.7

SD TREAT	NONE	CHITTED	MEAN
INOCULUM			
NONE	23.6	24.3	24.0
RHIZOCT	21.3	21.4	21.3
MEAN	22.5	22.8	22.7

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
A COMET	24.3	24.4	23.5	21.5
ESTIMA	34.2	32.4	30.7	31.0
M PEER	18.9	21.8	16.5	17.8
U PRINCE	19.3	20.2	16.8	16.9
U SCEPTR	21.5	22.8	19.1	19.5

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

TABLE	VARIETY	INOCULUM	SD TREAT	VARIETY INOCULUM
SED	1.44	0.91	0.91	2.03

TABLE	VARIETY SD TREAT	INOCULUM SD TREAT	VARIETY INOCULUM SD TREAT
SED	2.03	1.29	2.88

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

STRATUM	DF	SE	CV%
BLOCK.WP	38	3.52	15.5

https://doi.org/10.23637/ERADOC-1-32

84/R/P/1 EARLY POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
A COMET	39.7	65.5	52.6
ESTIMA	77.0	84.0	80.5
M PEER	32.3	50.5	41.4
U PRINCE	65.3	80.3	72.8
U SCEPTR	42.5	67.5	55.0
MEAN	51.4	69.6	60.5

SD TREAT VARIETY	NONE	CHITTED	MEAN
A COMET	50.7	54.5	52.6
ESTIMA	80.9	80.2	80.5
M PEER	41.9	40.9	41.4
U PRINCE	78.1	67.5	72.8
U SCEPTR	53.5	56.5	55.0
MEAN	61.0	59.9	60.5

SD TREAT INOCULUM	NONE	CHITTED	MEAN
NONE	54.6	48.1	51.4
RHIZOCT	67.4	71.7	69.6
MEAN	61.0	59.9	60.5

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
A COMET	35.1	44.2	66.2	64.7
ESTIMA	79.8	74.3	82.0	86.0
M PEER	39.7	24.9	44.1	56.9
U PRINCE	74.8	55.8	81.4	79.2
U SCEPTR	43.9	41.1	63.1	71.9

PLOT AREA HARVESTED 0.00103

https://doi.org/10.23637/ERADOC-1-32

84/R/P/1 MAIN CROP POTATOES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
CARA	47.7	43.0	45.4
DESIREE	29.3	27.4	28.3
K EDWARD	32.1	25.9	29.0
M PIPER	30.1	28.4	29.2
P CROWN	44.4	39.3	41.9
P SQUIRE	40.4	32.9	36.6
RECORD	25.5	22.2	23.9
MEAN	35.6	31.3	33.5

SD TREAT VARIETY	NONE	CHITTED	MEAN
CARA	43.8	46.9	45.4
DESIREE	29.5	27.2	28.3
K EDWARD	27.9	30.1	29.0
M PIPER	29.3	29.2	29.2
P CROWN	41.6	42.2	41.9
P SQUIRE	37.6	35.7	36.6
RECORD	24.3	23.5	23.9
MEAN	33.4	33.5	33.5

SD TREAT INOCULUM	NONE	CHITTED	MEAN
NONE	35.7	35.6	35.6
RHIZOCT	31.1	31.5	31.3
MEAN	33.4	33.5	33.5

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
CARA	46.8	48.6	40.8	45.2
DESIREE	30.7	27.9	28.3	26.4
K EDWARD	31.6	32.6	24.2	27.5
M PIPER	29.0	31.2	29.6	27.2
P CROWN	43.9	45.0	39.3	39.4
P SQUIRE	41.9	38.9	33.2	32.5
RECORD	26.3	24.8	22.2	22.2

https://doi.org/10.23637/ERADOC-1-32

84/R/P/1 MAIN CROP POTATOES

TOTAL TUBERS TONNES/HECTARE

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

TABLE	VARIETY	INOCULUM	SD TREAT	VARIETY INOCULUM
SED	1.71	0.91	0.91	2.42

TABLE	VARIETY SD TREAT	INOCULUM SD TREAT	VARIETY INOCULUM SD TREAT
SED	2.42	1.29	3.42

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

STRATUM	DF	SE	CV%
BLOCK.WP	54	4.19	12.5

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84/R/P/1 MAIN CROP POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
CARA	90.3	91.4	90.9
DESIREE	77.9	78.5	78.2
K EDWARD	49.9	55.1	52.5
M PIPER	72.3	72.9	72.6
P CROWN	91.2	91.5	91.4
P SQUIRE	90.8	89.1	90.0
RECORD	65.0	68.7	66.8
MEAN	76.8	78.2	77.5

SD TREAT VARIETY	NONE	CHITTED	MEAN
CARA	90.1	91.6	90.9
DESIREE	78.9	77.5	78.2
K EDWARD	51.4	53.5	52.5
M PIPER	70.8	74.4	72.6
P CROWN	91.4	91.3	91.4
P SQUIRE	88.7	91.2	90.0
RECORD	67.8	65.9	66.8
MEAN	77.0	77.9	77.5

SD TREAT INOCULUM	NONE	CHITTED	MEAN
NONE	77.0	76.5	76.8
RHIZOCT	77.0	79.4	78.2
MEAN	77.0	77.9	77.5

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
CARA	90.0	90.6	90.2	92.6
DESIREE	79.3	76.5	78.5	78.6
K EDWARD	50.0	49.7	52.8	57.3
M PIPER	70.0	74.5	71.5	74.3
P CROWN	91.4	91.0	91.4	91.6
P SQUIRE	89.8	91.9	87.7	90.6
RECORD	68.7	61.3	66.9	70.5

PLOT AREA HARVESTED 0.00103

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84/R/P/2

POTATOES

METHODS OF APPLYING FUNGICIDES TO SEED

Object: To compare spraying methods and rates of applying two fungicides to tubers on disease control and yield of potatoes - Gt. Knott II.

Sponsors: G.R. Cayley, G.A. Hide.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 1.5 x 9.52.

Treatments: All combinations of:-

1. FUNGCIDE	Fungicides applied to seed tubers:	
	IMAZALIL	Imazalil
	TOLC MET	Tolclofos methyl
2. FUNGRATE	Rates of applying fungicides, per tonne of tubers:	
	1	5 g imazalil, 12.5 g tolclofos methyl
	2	10 g imazalil, 62.5 g tolclofos methyl
3. FUNGMETH	Methods of applying fungicides:	
	CNVNTIAL	Conventional, hydraulic, sprayer in 2.0 l per tonne of tubers
	SP DS	Spinning disc sprayer in 0.8 l per tonne of tubers
	SP DS ES	Spinning disc sprayer with electrostatically charged particles in 0.8 l per tonne of tubers

plus one extra treatment:

EXTRA	
NONE	No fungicides to seed tubers (duplicated)

Basal applications: Manures: FYM at 45 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkiller: Metribuzin at 1.0 kg in 500 l. Fungicide: Fentin hydroxide at 0.28 kg in 200 l applied on seven occasions, the first and third occasion with the insecticide. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.56 kg ion in 200 l.

Seed: King Edward.

Cultivations, etc:- Subsoiled, tines 45 cm deep, 76 cm apart: 6 Oct, 1983. FYM applied: 4 Nov. Ploughed: 9 Nov. NPK Mg applied, heavy spring-tine cultivated: 23 Mar, 1984. Rotary harrowed: 14 Apr. Planted by hand: 16 Apr. Weedkiller applied: 31 May. Fungicide with insecticide applied: 19 June, 17 July. Fungicide alone applied: 3 July, 30 July, 13 Aug, 28 Aug, 11 Sept. Haulm mechanically destroyed, haulm desiccant applied: 4 Oct. Lifted: 16 Oct. Previous crops: S. barley 1982, w. oats 1983.

NOTE: Assessments of stem base infections were made in mid-July.

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TOTAL TUBERS TONNES/HECTARE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	30.5	32.8	31.7
TOLC MET	29.9	29.4	29.7
MEAN	30.2	31.1	30.7

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	31.5	30.5	33.0	31.7
TOLC MET	28.9	31.5	28.5	29.7
MEAN	30.2	31.0	30.8	30.7

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	28.8	31.1	30.9	30.2
2	31.6	30.9	30.7	31.1
MEAN	30.2	31.0	30.8	30.7

FUNGRATE	1			2		
FUNGMETH	CNVNTIAL	SP DS	SP DS ES	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE						
IMAZALIL	29.5	29.6	32.6	33.5	31.4	33.4
TOLC MET	28.0	32.6	29.1	29.8	30.4	28.0

NONE 30.7

GRAND MEAN 30.7

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

TABLE	FUNGCIDE	FUNGRATE	FUNGMETH	FUNGCIDE FUNGRATE
SED	0.98	0.98	1.21	1.39

TABLE	FUNGCIDE FUNGMETH	FUNGRATE FUNGMETH	FUNGCIDE FUNGRATE FUNGMETH
SED	1.70	1.70	2.41

SED FOR COMPARING NONE WITH ANY ITEM IN
FUNGCIDE.FUNGRATE.FUNGMETH TABLE IS 2.09

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

STRATUM	DF	SE	CV%
BLOCK.WP	40	3.41	11.1

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84/R/P/2

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	65.2	65.3	65.3
TOLC MET	65.9	65.3	65.6
MEAN	65.6	65.3	65.4

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	64.0	65.2	66.6	65.3
TOLC MET	66.6	66.4	63.8	65.6
MEAN	65.3	65.8	65.2	65.4

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	66.4	65.2	65.1	65.6
2	64.2	66.4	65.3	65.3
MEAN	65.3	65.8	65.2	65.4

FUNGRATE	1			2		
FUNGMETH	CNVNTIAL	SP DS	SP DS ES	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE						
IMAZALIL	64.3	64.7	66.6	63.7	65.7	66.6
TOLC MET	68.5	65.6	63.7	64.7	67.2	64.0

NONE 66.5

GRAND MEAN 65.6

PLOT AREA HARVESTED 0.00120

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84/R/P/3

POTATOES

SEED HEALTH

Object: To study the effects of three amounts of pests and disease control on two potato varieties grown for seed - Summerdells I.

Sponsors: R.W. Gibson, R. Harrington, G.A. Hide, G.R. Cayley, D.H. Lapwood.

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

Whole plot dimensions: 18.0 x 7.62.

Treatments: All combinations of:-

Whole plots

1. VARIETY	Varieties:
K EDWARD	King Edward
M PIPER	Maris Piper

Sub plots

2. PATHCONT	Pest and pathogen control (in addition to basals):
STANDARD	None
ENHANCED	Seed treatment with tolclofos methyl at 0.24 kg and imazalil at 0.010 kg per tonne of tubers, applied by hydraulic and uncharged electrostatic sprayers respectively. Cypermethrin at 0.04 kg with 7.0 l oil in 500 l applied by hydraulic sprayer on 31 May, 1984. Plants with 'virus' symptoms were removed on 11 June, 20 June and 5 July.
FULL	As for ENHANCED plus:- The imazalil was applied by charged electrostatic sprayer. Plants with 'blackleg' symptons were removed on 11 June, 20 June and 5 July. Permethrin at 0.10 kg with oil at 7.0 l, in 200 l for the first and last occasions and 500 l for the remainder, was applied on 15 June, 29 June, 16 July, 27 July and (to HAULM D LATER plots only) 13 Aug.
3. HAULM D	Dates of destroying haulm and of lifting:
EARLY	Haulm mechanically destroyed, 3 Aug, 1984. Haulm desiccant applied 6 Aug and potatoes lifted 6 Sept.
LATER	Haulm mechanically destroyed 8 Sept. Haulm desiccant applied 22 Sept and potatoes lifted 11 Oct.

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Basal applications: Manures: (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Paraquat at 0.80 kg ion in 250 l on two occasions, with the linuron on the second. Linuron at 1.3 kg. Fungicide: Fentin hydroxide at 0.28 kg in 200 l on six occasions (on the fifth and sixth to HAULM D LATER only) applied with the pirimicarb on all but the fifth occasion. Insecticides: Pirimicarb at 0.14 kg on five occasions (on the fifth to HAULM D LATER only). Phorate at 1.7 kg. Haulm desiccant: BOV at 170 l.

Cultivations, etc:- Disced: 2 Sept, 1983. PK applied: 5 Sept. Paraquat applied: 23 Sept. Ploughed: 22 Dec. NPK Mg applied: 3 Apr, 1984. Rotary harrowed, potatoes planted, phorate applied: 10 Apr. Linuron with paraquat applied: 3 May. Fentin hydroxide with pirimicarb applied to all plots: 19 June, 3 July, 17 July, 30 July. Fentin hydroxide applied to HAULM D LATER plots: 13 Aug. Fentin hydroxide with pirimicarb applied to HAULM D LATER plots: 28 Aug. Previous crops: S. barley 1982 and 1983.

NOTE: Aphids were counted throughout the season. Virus and blackleg counts were made in mid-June and mid-July.

TOTAL TUBERS TONNES/HECTARE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
K EDWARD	33.8	33.7	25.3	30.9
M PIPER	32.3	31.4	23.8	29.2
MEAN	33.0	32.5	24.6	30.0

HAULM D VARIETY	EARLY	LATER	MEAN
K EDWARD	24.0	37.8	30.9
M PIPER	22.2	36.2	29.2
MEAN	23.1	37.0	30.0

HAULM D PATHCONT	EARLY	LATER	MEAN
STANDARD	25.5	40.6	33.0
ENHANCED	25.1	39.9	32.5
FULL	18.7	30.4	24.6
MEAN	23.1	37.0	30.0

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84/R/P/3

TOTAL TUBERS TONNES/HECTARE

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

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D	EARLY	LATER	EARLY	LATER	EARLY	LATER
VARIETY						
K EDWARD	26.3	41.3	26.5	40.8	19.3	31.2
M PIPER	24.7	39.9	23.8	39.1	18.0	29.6

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

TABLE	PATHCONT	HAULM D	VARIETY* PATHCONT
SED	1.51	1.23	2.14

TABLE	VARIETY* HAULM D	PATHCONT HAULM D	VARIETY* PATHCONT HAULM D
SED	1.75	2.14	3.02

* WITHIN THE SAME LEVEL OF VARIETY ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	10	3.02	10.1

https://doi.org/10.23637/ERADOC-1-32

84/R/P/3

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
K EDWARD	65.8	59.6	57.0	60.8
M PIPER	51.8	48.5	35.9	45.4
MEAN	58.8	54.1	46.4	53.1

HAULM D VARIETY	EARLY	LATER	MEAN
K EDWARD	52.1	69.5	60.8
M PIPER	34.4	56.5	45.4
MEAN	43.2	63.0	53.1

HAULM D PATHCONT	EARLY	LATER	MEAN
STANDARD	49.0	68.6	58.8
ENHANCED	41.3	66.8	54.1
FULL	39.4	53.5	46.4
MEAN	43.2	63.0	53.1

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D VARIETY	EARLY	LATER	EARLY	LATER	EARLY	LATER
K EDWARD	57.5	74.1	51.4	67.8	47.4	66.5
M PIPER	40.5	63.1	31.3	65.8	31.4	40.5

SUB PLOT AREA HARVESTED 0.00457

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