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73/R&W/P/1 - Stocks & Seed Treatment - Potatoes

Rothamsted Research

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73/R/P/1 and 73/W/P/1

POTATOES

SEED STOCKS AND SEED TREATMENT

Object: To study the effects of treating tubers with fumigant and systemic fungicides on tuber-borne diseases and yield of potatoes - Rothamsted (R) Little Hoos and Woburn (W) Horsepool.

Sponsors: G.A. Hide, R.L. Griffith, F. Bell.

Design: 4 blocks of 8 plots split into 4 (plus one extra block for sampling).

Whole plot dimensions: 5.69 x 9.52. Area harvested: 0.00135.

Treatments: All combinations of:-

Whole plots: 1. Varieties:

VARIETY

Pentland Crown
King Edward, Little Hoos (R) only
Majestic
Maris Piper, Horsepool (W) only
Record

Crown
Edward
Majestic
Piper
Record

2. Seed health:

HEALTH

Once grown
Healthier

Onegrown
Healthy

Sub plots: 3. Fungicide to seed tubers:

FUNGICIDE

None
Benomyl
Sec-butylamine (0.28 l per tonne of seed)
Thiabendazole

None
Benomyl
Secbutyl
Thiabend

NOTE: Benomyl and Thiabendazole applied as 0.1% dip at pH3 for 5 minutes.
Sec-butylamine applied as a fumigant vapour.

Basal applications: Manures: (13:13:20) at 1500 kg, Little Hoos (R), 1830 kg Horsepool (W). Weedkillers: Paraquat at 0.56 kg ion in 280 l, Horsepool (W). Linuron at 1.2 kg with paraquat at 0.42 kg ion in 450 l, Little Hoos (R), 280 l Horsepool (W). Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 370 l, Little Hoos (R), 390 l Horsepool (W). Fungicide: Mancozeb at 1.3 kg, in 370 l on two occasions, Little Hoos (R), in 390 l on the first occasion, in 370 l on the second occasion, Horsepool (W).

T3/R/P/1 and T3/W/P/1

Cultivations, etc.:-

Little Hoos (R): Deep-tine cultivated three times: 7 Aug, 1972, 22 Aug, 11 Sept. NPK applied: 23 Mar, 1973. Rotary cultivated, potatoes planted: 13 Apr. Weedkiller applied: 18 May. Fungicide with insecticide applied: 2 July. Fungicide applied: 24 July, 9 Aug. Sprayed with undiluted BOV at 220 l: 18 Sept. Lifted: 10 Oct. Previous crops: Barley 1971, grass ley 1972.

Horsepool (W): Paraquat applied: 2 Oct, 1972. Ploughed: 3 Jan, 1973. NPK applied: 26 Mar. Rotary harrowed, potatoes planted: 12 Apr. Linuron and paraquat applied: 12 May. Grubbed: 6 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 8 Oct. Previous crops: Barley 1971, beans 1972.

NOTE: Emergence counts were made in May. Samples were taken throughout the season for tuber-size distribution and disease assessments on growing progeny tubers. After burning off and before lifting, counts were made of plant and stem numbers. After harvest tubers were graded into 6 sizes and estimates were made of tuber infection with *Oospora*, *Rhizoctonia*, *Helminthosporium* and *Phoma*.

Standard errors per plot. Total tubers, tonnes/hectare:

Little Hoos (R): Whole plot: 1.28 or 2.8% (21 d.f.)
Sub plot: 2.17 or 4.7% (72 d.f.)
Horsepool (W): Whole plot: 2.50 or 7.6% (21 d.f.)
Sub plot: 3.59 or 10.9% (72 d.f.)

73/R/P/1 and 73/W/P/1

TABLES OF MEANS

LITTLE HOOS (R)

TOTAL TUBERS: TONNES/HECTARE

VARIETY	HEALTH		FUNGICIDE				Mean
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	
Crown	51.0	52.2	53.2	50.9	49.7	52.5	51.6
Edward	48.8	48.4	49.0	49.5	47.8	47.9	48.6
Majestic	47.4	51.9	49.8	49.7	48.9	50.2	49.6
Record	31.3	40.5	36.8	36.4	34.1	36.4	35.9
HEALTH							
	Onegrown		45.4	44.9	43.4	44.8	44.6
	Healthy		49.1	48.3	46.9	48.7	48.2
Mean			47.2	46.6	45.1	46.7	46.4

VARIETY	HEALTH				FUNGICIDE			
	None	Onegrown	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl
Crown	51.5	50.5	49.6	52.3	55.0	51.2	49.9	52.7
Edward	49.2	49.8	48.8	47.4	48.8	49.3	46.9	48.4
Majestic	48.0	47.2	46.7	47.8	51.6	52.2	51.1	52.5
Record	32.9	32.1	28.6	31.8	40.7	40.7	39.5	41.0

STANDARD ERRORS OF DIFFERENCES

VARIETY	HEALTH	FUNGICIDE	VARIETY	VARIETY	HEALTH	VARIETY
			HEALTH	FUNGICIDE	FUNGICIDE	HEALTH
						FUNGICIDE
0.64	0.45	0.54	0.90	1.14	0.80	1.61
Except when comparing means with same levels of						
VARIETY				1.09		
HEALTH					0.77	
VARIETY.HEALTH						1.54

73/R/P/1 and 73/W/P/1

LITTLE HDOS (R)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

VARIETY	HEALTH		FUNGICIDE				Mean
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	
Crown	95.3	94.5	94.8	94.1	96.0	94.7	94.9
Edward	75.5	72.1	74.0	70.3	76.7	74.1	73.8
Majestic	85.1	83.4	85.2	83.2	84.0	84.8	84.3
Record	82.1	83.4	83.1	82.6	83.3	82.0	82.8
HEALTH							
	Onegrown		85.5	83.1	85.1	84.3	84.5
	Healthy		83.0	82.0	84.9	83.5	83.4
Mean			84.3	82.5	85.0	83.9	83.9

VARIETY	HEALTH				FUNGICIDE			
	None	Onegrown	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
Crown	95.5	94.8	96.2	94.9	94.2	93.4	95.9	94.5
Edward	76.3	71.5	77.9	76.4	71.8	69.0	75.6	71.8
Majestic	87.4	84.1	83.4	85.7	83.0	82.3	84.6	83.9
Record	83.0	81.8	83.0	80.4	83.3	83.4	83.6	83.5

73/R/P/1 and 73/W/P/1

HORSEPOOL (W)

TOTAL TUBERS: TONNES/HECTARE

VARIETY	HEALTH		FUNGICIDE				Mean
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend	
Crown	33.4	33.6	33.6	31.7	36.5	32.3	33.5
Majestic	32.0	32.2	31.1	32.5	31.2	33.4	32.1
Piper	33.7	33.6	32.8	34.2	33.4	34.2	33.6
Record	32.4	31.4	32.3	34.9	27.8	32.6	31.9
	HEALTH						
	Onegrown		31.7	33.7	33.4	32.8	32.9
	Healthy		33.3	33.0	31.0	33.5	32.7
Mean			32.5	33.3	32.2	33.1	32.8

VARIETY	Onegrown				Healthy			
	None	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
Crown	34.0	31.9	37.0	30.8	33.2	31.5	36.0	33.8
Majestic	29.6	32.2	33.2	33.0	32.7	32.8	29.3	33.8
Piper	31.9	34.9	34.4	33.7	33.8	33.5	32.4	34.7
Record	31.2	35.7	29.3	33.6	33.3	34.2	26.3	31.7

STANDARD ERRORS OF DIFFERENCES

VARIETY	HEALTH	FUNGICIDE	VARIETY	VARIETY	HEALTH	VARIETY
			HEALTH	FUNGICIDE	FUNGICIDE	HEALTH
						FUNGICIDE
1.25	0.88	0.90	1.77	1.99	1.41	2.82
Except when comparing means with same levels of						
VARIETY				1.79		
HEALTH					1.27	
VARIETY. HEALTH						2.54

73/R/P/1 and 73/W/P/1

HORSEPOOL (W)

PERCENTAGE WARE: 4.44 CM (1.75 INCH) RIDDLE

VARIETY	HEALTH		FUNGICIDE				Mean		
	Onegrown	Healthy	None	Benomyl	Secbutyl	Thiabend			
Crown	93.0	91.0	91.0	91.3	93.4	92.1	92.0		
Majestic	80.7	79.9	79.7	79.8	79.2	82.5	80.3		
Piper	82.1	82.0	83.7	82.1	81.5	81.0	82.1		
Record	77.4	78.4	79.1	78.0	77.1	77.4	77.9		
	HEALTH								
	Onegrown		84.4	83.2	82.5	83.1	83.3		
	Healthy		82.3	82.5	83.1	83.5	82.8		
Mean			83.4	82.8	82.8	83.3	83.1		
VARIETY	HEALTH				FUNGICIDE				
	None	Onegrown	Benomyl	Secbutyl	Thiabend	None	Benomyl	Secbutyl	Thiabend
Crown	92.0	93.2	94.5	92.1	90.0	89.4	92.3	92.2	
Majestic	79.7	80.5	79.1	83.4	79.7	79.0	79.3	81.6	
Piper	85.4	82.4	79.9	80.9	81.9	81.9	83.0	81.2	
Record	80.6	76.6	76.5	76.0	77.6	79.5	77.7	78.9	