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86/R/P/4 Varieties and Stem Canker - Potatoes

Rothamsted Research

Rothamsted Research (1987) *86/R/P/4 Varieties and Stem Canker - Potatoes* ; Yields Of The Field Experiments 1986, pp 320 - 328 - DOI: <https://doi.org/10.23637/ERADOC-1-36>

86/R/P/4

POTATOES

VARIETIES AND STEM CANKER

Object: To study the effects of stem canker (*Rhizoctonia solani*) on plant growth and yield of three early and three maincrop potato varieties using small and large chitted and unchitted seed - Great Knott I.

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

Design: Early varieties: 3 randomised blocks of 12 plots.
Maincrop varieties: 3 randomised blocks of 24 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 |
| WILJA | Wilja |
| 2. INOCULUM | Inoculum to seed at planting: |
| NONE | None |
| RHIZOCT | R. solani inoculum |
| 3. SD SIZE | Mean seed sizes per tuber: |
| LARGE | 134 g |
| SMALL | 50 g |

To MAINCROP varieties, all combinations of:-

- | | |
|-------------|-------------------------------|
| 1. VARIETY | Varieties: |
| DESIREE | Desiree |
| M PIPER | Maris Piper |
| P SQUIRE | Pentland Squire |
| 2. INOCULUM | Inoculum to seed at planting: |
| NONE | None |
| RHIZOCT | R. solani inoculum |
| 3. SD SIZE | Mean seed sizes per tuber |
| LARGE | 134 g |
| SMALL | 50 g |
| 4. SD TREAT | Seed treatment: |
| NONE | |
| CHITTED | |

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- NOTES: (1) *Rhizoctonia inoculum* was grown on horticultural vermiculite and sprinkled over seed tubers at planting before covering.
(2) Large seed was spaced at 48 cm in the row and small seed at 30 cm.

Basal applications: Manures: Muriate of potash at 420 kg. FYM at 35 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, applied with the insecticide on the third occasion. Fentin hydroxide at 0.28 kg in 200 l on two occasions, applied with the insecticide on the first occasion. Insecticide: Pirimicarb at 0.14 kg on two occasions. Haulm desiccant: Diquat at 0.80 kg ion in 500 l.

Cultivations, etc.:— K applied: 12 Nov, 1985. FYM applied: 29 Nov. Ploughed: 10 Dec. NPK Mg applied, rotary harrowed: 30 Apr, 1986. Planted by hand: 1 May. Weedkillers applied: 26 May. Mancozeb applied: 30 June, 14 July, 12 Aug. Mancozeb with the insecticide applied: 28 July. Fentin hydroxide with the insecticide applied: 29 Aug. Fentin hydroxide applied: 11 Sept. Haulm desiccant applied: 17 Sept. Haulm mechanically destroyed: 1 Oct. Lifted: 2 Oct. Previous crops: W. wheat 1984, s. beans 1985.

NOTE: Plant samples were taken from all varieties in June, July and August, to assess stem canker, weight of foliage and weight and number of tubers.

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EARLY VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

| INOCULUM VARIETY | NONE | RHIZOCT | MEAN | |
|--------------------------|------------|---------|---------------|-------|
| A COMET | 60.8 | 55.7 | 58.3 | |
| ESTIMA | 55.3 | 53.6 | 54.5 | |
| WILJA | 58.4 | 53.9 | 56.2 | |
| MEAN | 58.2 | 54.4 | 56.3 | |
| SD SIZE VARIETY | LARGE | SMALL | MEAN | |
| A COMET | 59.2 | 57.3 | 58.3 | |
| ESTIMA | 51.9 | 57.1 | 54.5 | |
| WILJA | 58.0 | 54.4 | 56.2 | |
| MEAN | 56.4 | 56.3 | 56.3 | |
| SD SIZE INOCULUM | LARGE | SMALL | MEAN | |
| NONE | 58.2 | 58.1 | 58.2 | |
| RHIZOCT | 54.5 | 54.4 | 54.4 | |
| MEAN | 56.4 | 56.3 | 56.3 | |
| INOCULUM SD SIZE VARIETY | NONE LARGE | SMALL | RHIZOCT LARGE | SMALL |
| A COMET | 61.0 | 60.5 | 57.3 | 54.2 |
| ESTIMA | 53.7 | 57.0 | 50.1 | 57.1 |
| WILJA | 60.0 | 56.8 | 56.0 | 51.9 |

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

| TABLE | VARIETY | INOCULUM | SD SIZE | VARIETY INOCULUM |
|-------|-----------------|------------------|--------------------------|------------------|
| SED | 1.94 | 1.59 | 1.59 | 2.75 |
| TABLE | VARIETY SD SIZE | INOCULUM SD SIZE | VARIETY INOCULUM SD SIZE | |
| SED | 2.75 | 2.25 | 3.89 | |

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

| STRATUM | DF | SE | CV% |
|----------|----|------|-----|
| BLOCK.WP | 22 | 4.76 | 8.5 |

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EARLY VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

| INOCULUM VARIETY | NONE | RHIZOCT | MEAN | |
|--------------------------|------------|---------|---------------|-------|
| A COMET | 83.4 | 87.9 | 85.7 | |
| ESTIMA | 84.7 | 89.3 | 87.0 | |
| WILJA | 78.5 | 84.1 | 81.3 | |
| MEAN | 82.2 | 87.1 | 84.7 | |
| SD SIZE VARIETY | LARGE | SMALL | MEAN | |
| A COMET | 82.3 | 89.0 | 85.7 | |
| ESTIMA | 85.9 | 88.1 | 87.0 | |
| WILJA | 80.9 | 81.8 | 81.3 | |
| MEAN | 83.0 | 86.3 | 84.7 | |
| SD SIZE INOCULUM | LARGE | SMALL | MEAN | |
| NONE | 80.3 | 84.1 | 82.2 | |
| RHIZOCT | 85.8 | 88.5 | 87.1 | |
| MEAN | 83.0 | 86.3 | 84.7 | |
| INOCULUM SD SIZE VARIETY | NONE LARGE | SMALL | RHIZOCT LARGE | SMALL |
| A COMET | 78.8 | 87.9 | 85.9 | 90.0 |
| ESTIMA | 84.3 | 85.2 | 87.5 | 91.0 |
| WILJA | 77.8 | 79.1 | 83.9 | 84.4 |

PLOT AREA HARVESTED SD SIZE LARGE 0.00053
SD SIZE SMALL 0.00091

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MAINCROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

| | | | | |
|----------|-------|---------|-------|-------|
| INOCULUM | NONE | RHIZOCT | MEAN | |
| VARIETY | | | | |
| DESIREE | 50.4 | 47.7 | 49.0 | |
| M PIPER | 58.5 | 54.3 | 56.4 | |
| P SQUIRE | 56.8 | 47.4 | 52.1 | |
| MEAN | 55.2 | 49.8 | 52.5 | |
| SD SIZE | LARGE | SMALL | MEAN | |
| VARIETY | | | | |
| DESIREE | 49.7 | 48.3 | 49.0 | |
| M PIPER | 56.4 | 56.4 | 56.4 | |
| P SQUIRE | 52.7 | 51.5 | 52.1 | |
| MEAN | 52.9 | 52.1 | 52.5 | |
| SD SIZE | LARGE | SMALL | MEAN | |
| INOCULUM | | | | |
| NONE | 54.5 | 55.9 | 55.2 | |
| RHIZOCT | 51.3 | 48.2 | 49.8 | |
| MEAN | 52.9 | 52.1 | 52.5 | |
| SD TREAT | NONE | CHITTED | MEAN | |
| VARIETY | | | | |
| DESIREE | 46.5 | 51.5 | 49.0 | |
| M PIPER | 54.7 | 58.1 | 56.4 | |
| P SQUIRE | 50.9 | 53.3 | 52.1 | |
| MEAN | 50.7 | 54.3 | 52.5 | |
| SD TREAT | NONE | CHITTED | MEAN | |
| INOCULUM | | | | |
| NONE | 54.2 | 56.2 | 55.2 | |
| RHIZOCT | 47.2 | 52.4 | 49.8 | |
| MEAN | 50.7 | 54.3 | 52.5 | |
| SD TREAT | NONE | CHITTED | MEAN | |
| SD SIZE | | | | |
| LARGE | 51.2 | 54.6 | 52.9 | |
| SMALL | 50.2 | 54.0 | 52.1 | |
| MEAN | 50.7 | 54.3 | 52.5 | |
| INOCULUM | NONE | RHIZOCT | | |
| SD SIZE | LARGE | SMALL | LARGE | SMALL |
| VARIETY | | | | |
| DESIREE | 50.5 | 50.2 | 48.9 | 46.4 |
| M PIPER | 57.3 | 59.6 | 55.5 | 53.1 |
| P SQUIRE | 55.8 | 57.9 | 49.6 | 45.1 |

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MAINCROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

| INOCULUM | NONE | CHITTED | RHIZOCT | NONE | CHITTED |
|----------|----------|---------|---------|---------|---------|
| SD TREAT | NONE | CHITTED | NONE | CHITTED | |
| VARIETY | | | | | |
| DESIREE | 48.3 | 52.5 | 44.8 | 50.6 | |
| M PIPER | 57.2 | 59.7 | 52.3 | 56.4 | |
| P SQUIRE | 57.2 | 56.5 | 44.6 | 50.1 | |
| SD SIZE | LARGE | | SMALL | | |
| SD TREAT | NONE | CHITTED | NONE | CHITTED | |
| VARIETY | | | | | |
| DESIREE | 47.4 | 51.9 | 45.6 | 51.1 | |
| M PIPER | 55.0 | 57.8 | 54.4 | 58.3 | |
| P SQUIRE | 51.2 | 54.1 | 50.5 | 52.5 | |
| SD SIZE | LARGE | | SMALL | | |
| SD TREAT | NONE | CHITTED | NONE | CHITTED | |
| INOCULUM | | | | | |
| NONE | 53.8 | 55.3 | 54.6 | 57.2 | |
| RHIZOCT | 48.7 | 54.0 | 45.8 | 50.7 | |
| VARIETY | SD SIZE | LARGE | CHITTED | SMALL | CHITTED |
| DESIREE | INOCULUM | NONE | | NONE | |
| | NONE | 49.3 | 51.7 | 47.2 | 53.2 |
| | RHIZOCT | 45.6 | 52.2 | 43.9 | 49.0 |
| M PIPER | NONE | 56.0 | 58.6 | 58.4 | 60.8 |
| | RHIZOCT | 54.0 | 57.0 | 50.5 | 55.8 |
| P SQUIRE | NONE | 56.1 | 55.4 | 58.2 | 57.6 |
| | RHIZOCT | 46.3 | 52.9 | 42.9 | 47.3 |

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MAINCROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

| TABLE | VARIETY | INOCULUM | SD SIZE | SD TREAT |
|-------|--------------------------------|---------------------------------|--|---------------------------------|
| SED | 1.03 | 0.84 | 0.84 | 0.84 |
| TABLE | VARIETY INOCULUM | VARIETY SD SIZE | INOCULUM SD SIZE | VARIETY SD TREAT |
| SED | 1.46 | 1.46 | 1.19 | 1.46 |
| TABLE | INOCULUM SD TREAT | SD SIZE SD TREAT | VARIETY INOCULUM SD SIZE | VARIETY INOCULUM SD TREAT |
| SED | 1.19 | 1.19 | 2.07 | 2.07 |
| TABLE | VARIETY SD SIZE SD TREAT | INOCULUM SD SIZE SD TREAT | VARIETY INOCULUM SD SIZE SD TREAT | |
| SED | 2.07 | 1.69 | 2.92 | |

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

| STRATUM | DF | SE | CV% |
|----------|----|------|-----|
| BLOCK.WP | 46 | 3.58 | 6.8 |

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MAINCROP VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

| | | | |
|----------|-------|---------|------|
| INOCULUM | NONE | RHIZOCT | MEAN |
| VARIETY | | | |
| DESIREE | 82.2 | 87.2 | 84.7 |
| M PIPER | 82.4 | 84.0 | 83.2 |
| P SQUIRE | 94.8 | 91.9 | 93.3 |
| MEAN | 86.4 | 87.7 | 87.1 |
| SD SIZE | LARGE | SMALL | MEAN |
| VARIETY | | | |
| DESIREE | 84.4 | 85.0 | 84.7 |
| M PIPER | 81.7 | 84.7 | 83.2 |
| P SQUIRE | 92.9 | 93.7 | 93.3 |
| MEAN | 86.4 | 87.8 | 87.1 |
| SD SIZE | LARGE | SMALL | MEAN |
| INOCULUM | | | |
| NONE | 86.2 | 86.7 | 86.4 |
| RHIZOCT | 86.5 | 88.9 | 87.7 |
| MEAN | 86.4 | 87.8 | 87.1 |
| SD TREAT | NONE | CHITTED | MEAN |
| VARIETY | | | |
| DESIREE | 83.6 | 85.9 | 84.7 |
| M PIPER | 82.9 | 83.5 | 83.2 |
| P SQUIRE | 92.2 | 94.4 | 93.3 |
| MEAN | 86.2 | 87.9 | 87.1 |
| SD TREAT | NONE | CHITTED | MEAN |
| INOCULUM | | | |
| NONE | 85.1 | 87.8 | 86.4 |
| RHIZOCT | 87.4 | 88.1 | 87.7 |
| MEAN | 86.2 | 87.9 | 87.1 |
| SD TREAT | NONE | CHITTED | MEAN |
| SD SIZE | | | |
| LARGE | 85.5 | 87.2 | 86.4 |
| SMALL | 87.0 | 88.6 | 87.8 |
| MEAN | 86.2 | 87.9 | 87.1 |

86/R/P/4

MAINCROP VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

| INOCULUM | NONE | SMALL | RHIZOCT | SMALL |
|----------|-------|-------|---------|-------|
| SD SIZE | LARGE | SMALL | LARGE | SMALL |
| VARIETY | | | | |
| DESIREE | 82.5 | 81.9 | 86.4 | 88.1 |
| M PIPER | 81.1 | 83.6 | 82.3 | 85.8 |
| P SQUIRE | 94.9 | 94.6 | 90.9 | 92.8 |

| INOCULUM | NONE | CHITTED | RHIZOCT | CHITTED |
|----------|------|---------|---------|---------|
| SD TREAT | NONE | CHITTED | NONE | CHITTED |
| VARIETY | | | | |
| DESIREE | 80.3 | 84.0 | 86.8 | 87.7 |
| M PIPER | 81.0 | 83.7 | 84.8 | 83.3 |
| P SQUIRE | 93.9 | 95.6 | 90.5 | 93.3 |

| SD SIZE | LARGE | SMALL | SMALL | CHITTED |
|----------|-------|---------|-------|---------|
| SD TREAT | NONE | CHITTED | NONE | CHITTED |
| VARIETY | | | | |
| DESIREE | 83.0 | 85.9 | 84.1 | 85.9 |
| M PIPER | 81.5 | 81.9 | 84.3 | 85.1 |
| P SQUIRE | 91.9 | 94.0 | 92.5 | 94.9 |

| SD SIZE | LARGE | SMALL | SMALL | CHITTED |
|----------|-------|---------|-------|---------|
| SD TREAT | NONE | CHITTED | NONE | CHITTED |
| INOCULUM | | | | |
| NONE | 84.9 | 87.4 | 85.2 | 88.1 |
| RHIZOCT | 86.0 | 87.1 | 88.7 | 89.1 |

| SD SIZE | LARGE | SMALL | SMALL | CHITTED | |
|----------|----------|---------|-------|---------|------|
| SD TREAT | NONE | CHITTED | NONE | CHITTED | |
| VARIETY | INOCULUM | | | | |
| DESIREE | NONE | 80.7 | 84.3 | 80.0 | 83.8 |
| | RHIZOCT | 85.3 | 87.5 | 88.3 | 87.9 |
| M PIPER | NONE | 79.7 | 82.5 | 82.3 | 84.9 |
| | RHIZOCT | 83.3 | 81.3 | 86.4 | 85.2 |
| P SQUIRE | NONE | 94.4 | 95.5 | 93.5 | 95.7 |
| | RHIZOCT | 89.4 | 92.4 | 91.5 | 94.2 |

| | | |
|---------------------|---------------|---------|
| PLOT AREA HARVESTED | SD SIZE SMALL | 0.00091 |
| | SD SIZE LARGE | 0.00053 |