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Potato pink rot control in the South East of South Australia

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POTATO PINK ROT CONTROL IN THE SOUTH EAST OF SOUTH AUSTRALIA

HORTICULTURE AUSTRALIA LIMITED

FINAL REPORT

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PROJECT PT01042

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INDUSTRY SUMMARY

Investigations on the control of the disease pink rot were undertaken in three field experiments.

These experiments were a continuation of previous studies (HAL report PT 97004) and were aimed at fine tuning further use of Ridomil for the control of pink rot.

The findings were limited as no disease developed in all three field trials. Tuber testing of treatments after artificial inoculation with *Phytophthora erythroseptica* did however show that Ridomil treatments had a protectant effect against pink rot.

TECHNICAL SUMMARY

Large field experiments were carried out on commercial properties in 2001. In these studies the efficacy of Ridomil was evaluated as in furrow applications compared with Ridomil Granules at planting. In addition these were compared with two foliar applications of Ridomil MZ applied at tuber initiation and approximately 14 days later.

Although no disease developed in the trial plots, post harvest tuber testing showed that Ridomil Granules used at 20kg/ha at planting provided continued protection against pink rot.

TECHNICAL REPORT

Introduction

Pink rot is a serious soil and tuber borne disease of potatoes common to many of the potato growing areas of Australia. Infected plants wilt and collapse due to rotting of the crown area of the stem. Potato roots and stolons are also attacked by the fungus which often grows along the stolon into the tuber. Infected tubers are initially spongy and rubbery, with further breakdown occurring as a result of the development of secondary soft rot bacteria. Losses can occur both in the field and in storage.

In the south east of South Australia the disease has caused serious economic losses of up to 50% on some properties, with growers considering the problem to be increasing in all districts.

Field experiments were undertaken to investigate the further use of Ridomil for controlling pink rot.

Field Experiments

A total of three field experiments were set up to evaluate fungicide treatments for the control of pink rot. All field plots were sites in commercial potato crops at Kalangadoo approximately 400km south east of Adelaide. The experimental sites were selected in areas which according to the grower were those most likely to develop pink rot.

Experiments 1 - 3

Materials and Methods

Field experiments 1 and 2 were planted to Russet Burbank tubers on 22nd October 2001 with rows spaced at 85cm. Experiment 3 was also planted to Russet Burbank on 26th November 2001 with rows spaced at 80cm. Both fields had been planted to potatoes 5 years previously with pasture crops grown in the interim. A centre pivot supplied overhead irrigation delivering approximately 15mm every 2-3 days.

Each experiment consisted of two identical blocks of five treatments. Treatment plots were 4 rows each 5m long, with a 5m buffer between treatments. Six replicates of each treatment were set up in a randomised block design. In furrow treatments of 0.52kg and 1.04kg/ha Ridomil Gold 480 EC and Ridomil Gold Granules at 10kg/ha and 20kg/ha were applied at planting. One block at each site was sprayed by the grower with two foliar applications of Ridomil Gold MZ at 2.5kg/ha at tuber initiation and approximately 14 days later.

Plots were harvested at 154 days (Expts 1 & 2) and 136 days (Expt 3) after planting. This was done by hand digging a 2m long section in each of the centre two rows of each plot. All tubers (approximately 100) were carefully examined for the presence of pink rot.

Results

Tubers infected with pink rot were not found in any of the control plots or other treatments. Because of this, tubers from each replicate were selected at random and stored at 4°C for 8 weeks before they were artificially inoculated with *P. erythroseptica*. This was carried out to determine if any of the treatments had residual levels of fungicide inhibiting *P. erythroseptica.*

Tuber Testing

Materials and Methods

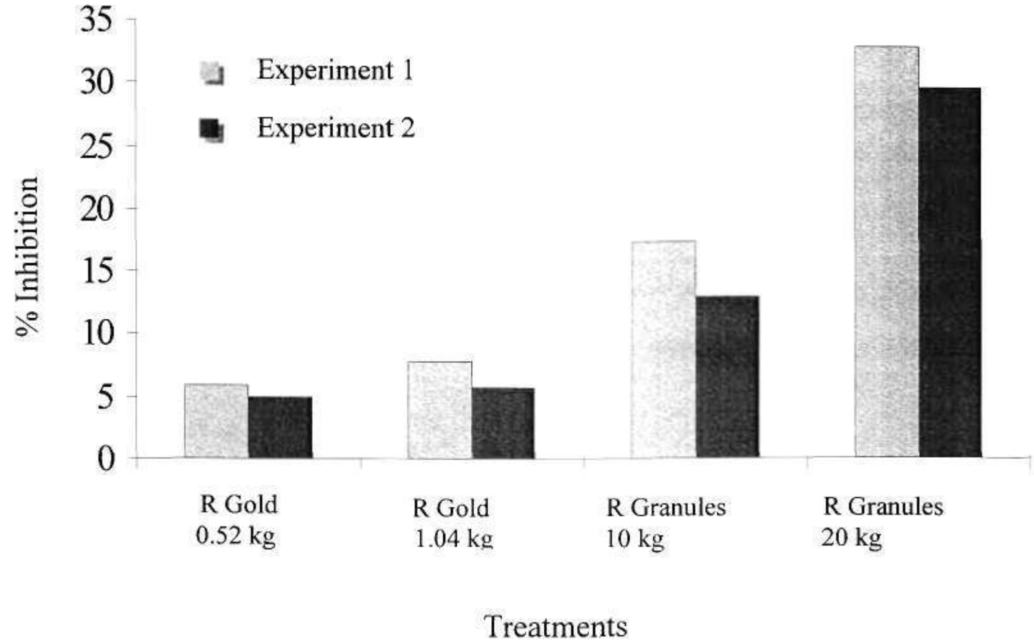
Five tubers from 4 replicates of each treatment were surface sterilised in a 0.4% chlorine solution for 3 minutes, rinsed with deionised water and sprayed with 70% alcohol. A culture of *P. erythroseptica* recovered from a potato from the Kalangadoo area four years previously was grown for 4-5 days on Corn Meal Agar (CMA) and used for inoculations. Tubers were inoculated by placing a 6mm plug of active mycelia in a hole 10mm deep at the end of each tuber. The plug of tuber tissue was replaced and the area resealed.

Tubers were placed in sealed plastic bags and incubated in the dark at 22°C for 10 days before being cut in half lengthways and left for at least 1 hour. This ensured diseased tissue turned pink before the area infected was measured and the percentage area of infected tissue assessed for each tuber. Percentage inhibition was calculated based on the relative area infected of the treated tubers compared to the area of infected control tubers. Isolations from infected tissue of control plot tubers were placed on CMA to confirm the causal pathogen of pinking as *P. erythroseptica.*

Results

All tubers were infected by *P. erythroseptica,* however the area of infection varied between treatments indicating differences in carry over of fungicide residues.

Figure 1. Tuber Testing – Experiments 1 & 2: - Susceptibility of tubers artificially inoculated with *P. erythroseptica* in blocks where two Foliar Ridomil MZ sprays were applied.

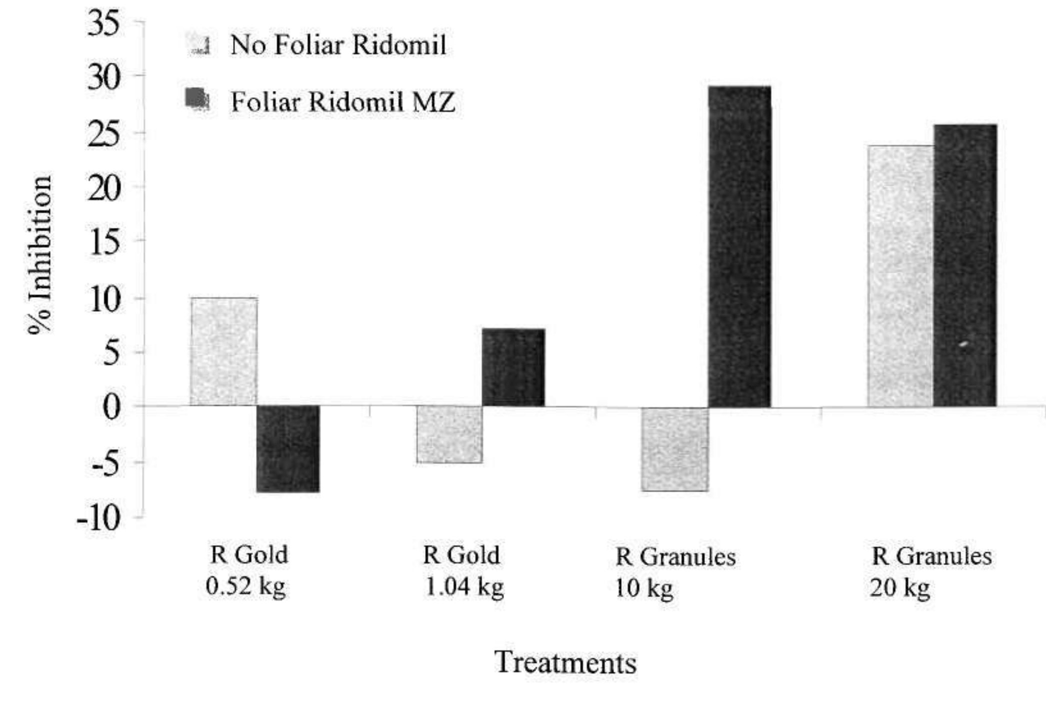


In experiments 1 and 2 the tubers from all treatments showed inhibited growth of *P. erythroseptica* (Figure 1). As expected the higher rates of the in furrow Ridomil Gold and Ridomil Granules showed the greatest inhibition in both experiments. Overall the Ridomil Granules were the most effective treatment and showed that the lower rate at 10kg/ha was more effective than the higher rate of the in furrow Ridomil Gold (1.04kg/ha)

In those treatments where two sprays of Ridomil MZ was applied the tubers showed the most inhibited growth of *P. erythroseptica* (Figure 2). The only treatment which did not inhibit the growth of *P. erythroseptica* was the lowest rate of Ridomil Gold (0.52kg/ha), where the area of infection in the treated tubers was greater than the untreated control.

Both rates of Ridomil Granules at 10kg/ha and 20kg/ha were inhibitory when the foliar application was applied. Negative inhibition was achieved at the lower Ridomil Granule rate (10kg/ha) in the block where foliar Ridomil was not applied and the reason for this is unknown.

Figure 2. Tuber Testing – Experiment 3:- Susceptibility of tubers artificially inoculated with *P. erythroseptica*.



Conclusion

These results show, as suggested in previous work, that Ridomil Granules applied at 20kg/ha at planting is the most effective treatment against pink rot. Residual fungicide in the tubers may prevent infection from occurring throughout the season, however whether this is sufficient to prevent natural infection is unknown. Conclusions are difficult to draw as no natural infection occurred in all three field experiments.

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