METALAXYL CONTROLS PHYTOPHTHORA ROT OF ASPARAGUS

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SUMMARY

Metalaxyl was applied at three rates (0.75, 1.00 and 1.25 kg ai/ha) in each of two seasons to plots of mature asparagus for *Phytophthora* rot control. Applications were made 3 weeks before commencement of harvest. Yields were increased (up to 43%) after the first application in 1985, although there was no reduction in the number of diseased spears. In the second year of application (1986), metalaxyl reduced diseased spears from 16 to 2% and increased yields by up to 75%. Yields and disease levels were similar for all three rates tested. Increased early yields after metalaxyl treatment became apparent after 25 days of picking.

INTRODUCTION

Spear and root rot of asparagus, caused by *Phytophthora megasperma* var. *sojae*, has become a major problem in many asparagus growing areas in the southern North Island. The disease can cause losses of up to 50% of spears during long wet periods in early spring. Losses in total production are often underestimated by the growers as the disease occurs below ground.

Phytophthora rot on asparagus was first recorded in Auckland (NZ) in 1974 (Boesewinkel 1974). Bussell and Ryan (1974) reported that all crowns examined in trials at Levin and Hastings were infected by *P. megasperma*. Recently the disease has been found to be widespread in all major asparagus production areas (Falloon 1982).

Infected spears show water soaked, slightly sunken lesions at or above soil level and are usually crooked. Infected root systems are brown to dark brown, and water soaked.

The fungicide metalaxyl has been shown to effectively control the disease in California (Falloon *et al* 1983). In New Zealand yields were significantly increased after two applications of metalaxyl (Nikoloff 1984). This paper outlines a trial to measure effects of metalaxyl on *Phytophthora* spear and root rot of asparagus.

METHODS

The trial was on an established 6-year-old block of asparagus cv. "Rutgers Beacon" in Levin silt loam at Levin Horticultural Research Centre. Spear and root rot caused by *P. megasperma* had been a problem during the previous four seasons. The experimental design was a randomized block of five replications. Plots were 6 m long and 1.5 m apart, plants were 0.4 m apart in a single row. Metalaxyl (Ridomil 5G — granular formulation) at 3 rates (0.75, 1.00 and 1.25 kg ai/ha) was spread in a band 0.2 m wide along the centre of the rows. The fungicide was applied once in each year, on 16 September 1985 and 29 August 1986, 3 weeks before harvesting began. Control plots were left untreated. After application, fungicide was watered into the soil by irrigation. The trial was inoculated by drenching the root systems with mycelial suspensions (50 ml/plant) of *P. megasperma* during rainy periods to enhance infection. These suspensions were prepared by macerating pure culture of *P. megasperma* (7-day-old) in sterile water with a blender.

The crop was harvested twice weekly from September to December of both years. Harvested spears were graded and weighed, and the number of diseased spears was recorded.

RESULTS

Metalaxyl at three rates increased yields of saleable asparagus spears by up to 43% during the first season (1985), although there was no reduction in the number of

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TABLE 1: Effect of metalaxyl on *Phytophthora* spear rot and yields of asparagus

Treatment (kg ai/ha)	Percentage diseased spears		Saleable yield (t/ha)	
	1985	1986	1985	1986
metalaxyl 0.75	12.1	1.7	2.0	3.3
metalaxyl 1.00	12.4	1.9	2.0	3.7
metalaxyl 1.25	8.0	1.9	1.9	3.7
untreated control	11.0	15.8	1.4	2.1
LSD (P = 0.05)	6.8	2.6	0.4	1.0

diseased spears (Table 1). In the second season (1986), metalaxyl reduced the proportion of diseased spears from 16 to 2% and increased yields by up to 75%. In both seasons, there were no differences in numbers of diseased spears or yields between the three rates tested.

The effect of the treatments on accumulated yields in 1986 is shown in Fig. 1. Increased yields due to fungicide treatment became apparent 25 days after the first pick, and the differences between treated and control treatments became greater with time.

Fig. 1: Effect of metalaxyl on cumulative yields of asparagus in *Phytophthora* infested soil (1986)

DISCUSSION

Results from this trial agree with those obtained in California (Falloon *et al* 1985) and in New Zealand (Nikoloff 1984) and show that metalaxyl is highly effective for *Phytophthora* rot control. The results also show that one application of fungicide during spring is enough to give disease control throughout the production season.

P. megasperma reduces asparagus yields by infecting spears as well as roots and crowns. In the first season of fungicide application, significant increases in yields were observed without a reduction in diseased spears. This indicates that the effect of the disease can be underestimated because root and crown infection reduce plant vigour, although the disease may not occur on the spears.

The increase in yield of up to 75% in the second season as compared with 43% during the first season, suggests a cumulative effect of metalaxyl on disease control. Although a similar effect was observed by Falloon (1986), the present result could have been influenced by different climate or inoculum levels.

As there was no significant difference in yield or in number of diseased spears between the three rates tested, the lowest rate (0.75 kg ai/ha) is probably sufficient for acceptable disease control.

Another beneficial effect of metalaxyl was that it increased early asparagus yields. Increases in early and total yields mean that soil application of metalaxyl is likely to be an economic method for Phytophthora rot control in asparagus (Nikoloff 1986).

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