CONTROL OF *DIDYMELLA* STEM CANKER ON GLASSHOUSE TOMATOES

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SUMMARY

Fungicides for control of *Didymella* stem canker of tomato were evaluated in glasshouse trials. Procymidone gave the best control of the disease of the seven fungicides tested (benomyl, captafol, captan, iprodione, prochloraz, procymidone and copper oxychloride plus mancozeb). In the timing of application trial, the first three applications of procymidone immediately after pruning gave the most effective control. The timing of spray application is discussed in relation to disease control.

INTRODUCTION

Didymella stem canker of tomatoes is caused by the fungus *Didymella lycopersici*. Symptoms first appear as small brown to black lesions on the stem following infection through pruning wounds (Soteris and Cheah 1982a). The canker increases in size and the pith within the infected region becomes discoloured and gradually disintegrates. Eventually the plant wilts and dies. Infected fruit will show blackened sunken rots around the calyx.

In New Zealand, the disease was recorded first by Cunningham (1922). In the 1950's it caused damage to crops in Timaru, Nelson and Christchurch (Smith and Hurndell 1959). During the 1981-82 season there was a serious outbreak in the Horowhenua area (Soteris and Cheah 1982a). The disease was not controlled by the routine fungicide spray programme used by tomato growers.

Although *Didymella* stem canker is a common disease of tomatoes in Asia, Europe, North and Central America countries (CMI Distribution Map No. 324), it has not been recorded in Australia. As a consequence tomatoes could not be exported to Australia from Horowhenua last year.

In laboratory screening tests, captafol, iprodione and procymidone were found to be the most effective at inhibiting mycelial growth (Soteris and Cheah 1982b). This paper reports on evaluation of these and other fungicides, and the timing of application of two of the most effective fungicides for control of the disease on glasshouse grown tomatoes.

MATERIALS AND METHODS

(a) Fungicide evaluation

Fungicides were compared in two glasshouses. Tomato seedlings cv. 'Nemarex' were planted into the glasshouses on 15 June 1982 in single rows of 20 plants at a spacing of 25 cm between plants and 1 m between rows. Each plot consisted of two rows of five plants each. The experimental design was a randomised block with two replications in each glasshouse. Crop management followed routine commercial practice.

Plants were inoculated with spore and mycelium suspensions from pure cultures of *D. lycopersici* onto the wounds immediately after pruning. Plants were inoculated on 5 July and two further applications were made at 3 day intervals to ensure infection.

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The fungicides and rates tested are listed in Table 1. Stem and foliage cover sprays of each fungicide were applied to run off with a knapsack sprayer. The spray programme was commenced on 15 July 1982, with a total of five applications at 10 to 14 day intervals.

Disease was assessed on 10 and 16 August 1982 by counting the number of cankers per plant and the number of wilted plants.

(b) Timing of application

In the second trial tomato seedlings cv 'Nemarex' were transplanted into a glasshouse on 3 November 1982. The experimental design was a randomised block with five replications. Each plot consisted of single rows of five plants and management was similar to that of the previous trial.

The plants were inoculated once on 25 November 1982 with a spore and mycelium suspension of *D. lycopersici* onto the pruning wounds.

The fungicides used and the timing of spray applications are listed in Table 2. The first application was made on 29 November 1982, with further applications on 9 December, 19 December and on 29 December.

Disease was assessed at weekly intervals from 9 December 1982 to 10 January 1983. Fruit were harvested and weighed as they ripened between 23 December 1982 and 18 February 1983.

TABLE 1: Efficacy of fungicides in controlling *Didymella* stem canker in glasshouse tomato.

Treatment	Rate (g ai/100 litre)	No. cankers/plant		% wilted plant
		10 August 1982	16 August 1982	
benomyl (Benlate 50W)	50	4.02	87.5	
captafol (Difolatan 80W)	80	3.55	82.5	
captan (Orthocide 80W)	80	2.82	87.5	
iprodione (Rovral 25F)	50	3.25	72.5	
procymidone (Sumisclex 25F)	50	0.45	0.5	
prochloraz (Sportak 45E)	50	3.05	82.5	
copper oxychloride (50W)	250	4.12	97.5	
plus mancozeb (Manzate 80W)	100			
untreated	—	3.15	95.0	
MSD (P = 5%)		1.20	18.5	

RESULTS

(a) Fungicide evaluation

Procymidone gave almost total control of stem canker at the time of assessment (Table 1). The other treatments did not provide effective control.

(b) Timing of application

The first three applications of procymidone (treatment 2) gave the best control of the disease and the highest yield (Table 2). Treatments 1 and 2 gave a lower percentage of wilted plants and higher yields as compared to treatments 3 and 4 which had missed the first application of procymidone. However, there was no significant difference in disease level and yield between treatments 1 and 3.

None of the iprodione treatments controlled the disease.

DISCUSSION

Of the seven fungicides tested, only procymidone was found to be highly effective against *Didymella* stem canker; it provided almost complete control. Although in England benomyl (Fletcher and Sharpe 1978) and iprodione (Gair and Wilcox 1982), and in New Zealand captan (Smith and Hurndell 1959) have been recommended for control of *Didymella* stem canker, they did not control the disease effectively in these two trials.

TABLE 2: Timing of fungicide applications for *Didymella* stem canker control on glasshouse tomatoes.

Treatment	Rate (g ai/100 litres)	29 Nov	9 Dec	19 Dec	29 Dec	% wilted plants (10 Jan. 1983)	Mean marketable yield (kg/plot)*
1. procymidone (Sumisclex 25% F)	50	+	+			12	4.52
2. procymidone	50	+	+	+		8	6.57
3. procymidone	50		+	+	+	36	3.22
4. procymidone	50		+	+		44	2.19
5. iprodione (Rovral 25% F)	50	+	+			100	0.69
6. iprodione	50	+	+	+		100	0.87
7. iprodione	50		+	+	+	80	1.55
8. iprodione	50		+	+		100	0.75
9. untreated						100	0.66
MSD (P = 5%)						26	2.05

* = 5 plants per plot + = fungicide applied on that date

In trial 2 those plants which missed the first applications of procymidone had a higher percentage of wilted plants indicating that the first application of procymidone is very important in preventing disease infection. The results also indicate that the first two applications of procymidone only may control the disease adequately, although a third application can give a better control. There was no significant difference between treatments 1 and 3 in either percentage of wilted plants or yield which suggests that when the first spray was missed, the disease severity may be lowered with an extra late spray.

In these two trials the high level of disease infection tested the fungicides much more severely than would normally occur in a commercial crop. Under these conditions, procymidone was the only fungicide which effectively controlled *Didymella* stem canker. Procymidone is fully registered for use on tomatoes and has been shown to be effective against *Botrytis* spp and *Sclerotinia* sp (Jackson and Smith 1979). It is evident from these trials that procymidone can be used as a protectant spray to prevent *Didymella* stem canker. It is recommended to spray immediately after pruning in order to obtain the maximum effectiveness.

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REFERENCES

- Commonwealth Mycological Institute, Distribution Maps of plant diseases, Map No. 324.1968.
- Cunningham, G.H., 1922. Some recent changes in the name of plant diseases, *N.Z. J. Agric.* 24: 37-45.
- Fletcher, J.T. and Sharpe, K., 1978. Control of *Didymella lycopersici* on tomato stems with fungicidal paints. *Plant Path.* 27: 194-197.
- Gair, R. and Wilcox, H.J., 1982. Control of pests and diseases of field vegetable. MAFF Booklet 2383.
- Jackson, I.F. and Smith, B.N., 1979. Procymidone evaluation for the control of *Sclerotinia* spp and *Botrytis* spp. *Proc. 32nd N.Z. Weed and Pest Control Conf.* 278-283.
- Smith, H.C. and Hurdell, L.C., 1959. Control of *Didymella* stem rot of tomatoes. *N.Z. Comm. Grower* 15 (2): 9-12.
- Soteros, J.J. and Cheah, L.H., 1982a. *Didymella* stem canker of tomato in the Horowhenua. *N.Z. Comm. Grower* 37 (2): 28-29.
- Soteros, J.J. and Cheah, L.H., 1982b. *Didymella* stem canker of tomato and its control. *Proc. 35th N.Z. Weed and Pest Control Conf.* 312-314.