DIDYMELLA STEM CANKER OF TOMATO AND ITS CONTROL

J.J. SOTEROS and L.H. CHEAH

*Plant Health and Diagnostic Station and Levin Horticultural Research Centre, MAF,
Levin*

SUMMARY

In the 1981-82 season tomato crops in the Horowhenua were inspected for *Didymella* stem canker and 26 out of 37 outdoor and all seven glasshouse crops were found to be infected. In some crops up to half the plants were infected and of these about 15% were killed by the disease. Cankers occurred only on mature plants when fruit was ripening. In the laboratory screening trials captafol, iprodione and procymidone were found to be the most effective at inhibiting mycelial growth.

INTRODUCTION

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. The canker increases in size and the pith within the infected region becomes discoloured and gradually disintegrates. Eventually the plant wilts and dies (Soteris and Cheah 1982).

The disease was first reported in New Zealand by Cunningham (1922) and in the 1950's caused crop damage in Timaru, Christchurch and Nelson (Smith and Hurndell 1959). It was first found in Horowhenua in 1969 on an outdoor crop at Manakau and is now common in both outdoor and on glasshouse tomato crops in the districts (Otaki, Manakau and Levin).

Didymella stem canker has not been recorded in Australia and as a consequence, an import ban was imposed on the trans-Tasman movement of tomatoes from the Horowhenua last year. During the 1981-82 season a serious outbreak of *Didymella* occurred which was not controlled by the routine fungicide spray programmes for use on tomatoes. This paper reports on the occurrence of *Didymella* in the districts and on an evaluation of alternative fungicides for effective control.

MATERIALS AND METHODS

Field survey

From September 1981 to February 1982, 37 outdoor and seven glasshouse crops were visited regularly (Table 1). The disease incidence was assessed by inspecting 200 tomato plants along two random rows in the crops and recording the number of infected plants. Plant samples were collected and isolates obtained from stem cankers to verify the presence of *Didymella*.

Laboratory screening

Plastic petri dishes containing 10 ml potato dextrose Marmite agar (PDMA) plus the appropriate fungicides (1, 10, 100, 1000 ppm) were prepared using the method of Pennycook and Corbin (1970).

Six mm diameter inoculum plugs were cut from colonies of *Didymella lycopersici* growing on PDMA plates. One plug was placed, mycelial surface downwards, in the centre of each plate containing PDMA plus fungicides (Table 2). Four replicates of each concentration of fungicide were made and the plates were incubated at 21°C. The diameter of the growth was measured after 7 days. The LD₅₀ of each fungicide was estimated by probit analysis.

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RESULTS

Field survey

Twenty six outdoor and all glasshouse crops were found to be infected (Table 1). Severe stem cankers were found only on mature plants with ripening fruit.

The incidence of disease varied from <5% infection to >25% infection. Nine crops (eight outdoor and one indoor) were found to be heavily infected, (25% to 55%), with up to 15% of infected plants killed by the disease. Field observations showed that higher proportions of the stalked cultivars 'Early Money' and 'Money Maker' were killed by the disease, whereas less than one percent of the plant deaths occurred in the dwarf cultivars, 'Hardy Cross', 'Scoresby' and 'Beef Steak'.

Laboratory screening

Of the 12 fungicides tested the three most effective were iprodione, captafol and procymidone (Table 2).

TABLE 1: Incidence of *Didymella* stem canker in tomato crops in Horowhenua during September 1981 to February 1982.

Cultivar	No. crops in disease incidence category *		
	High	Moderate	Low
Staked:			
Early Money	5	5	2
Money Maker	1	1	6
Assex	2	1	
Dwarf:			
Hardy Cross			1
Scoresby			1
Beef Steak			1
Glasshouse staked:			
Estrella	1	2	2
Argela			1
Eurocross			1

* Disease incidence; High 25% plants infected 15% killed
 Moderate 5-25% plants infected 5% killed
 Low 5% plants infected up to 1% killed

TABLE 2: LD₅₀ of fungicides for inhibition of mycelial growth of *Didymella lycopersici* in laboratory tests in PDMA.

Fungicide*	LD ₅₀ mycelial growth ppm
captafol	69
captan	275
iprodione	68
mancozeb	851
procymidone	125
propineb	691

* The fungicides benomyl, chlorothalonil, copper oxychloride, cupric hydroxide, triforine and vinclozolin all had LD₅₀ in excess of 1000 ppm.

DISCUSSION

The economic significance of *Didymella* was first recorded in New Zealand in 1959. Until now there have been no published reports on losses arising from this disease. The outbreak of *Didymella* in the Horowhenua during 1981-82 indicated how serious the disease can be in reducing yield, apart from the quarantine problems it causes in exporting to Australian markets.

Stem cankers only occurred on mature plants when fruit was ripening. In the laboratory three fungicides, iprodione, captan and procymidone were found to be effective at inhibiting the growth of *Didymella*. These fungicides were twice as good as captan which was recommended for the control of *Didymella* (Smith and Hurndell 1959) and eight times as good as benomyl which is recommended in England for the control of this disease (Fletcher and Sharpe 1978) applied as a slurry painted on the stems.

The incidence of disease appeared to be greater in areas where tomatoes had been successively grown for some time and/or where diseased plant debris from previous crops had been incorporated into the soil. Thus crop rotation and general hygiene are necessary in controlling this disease. A long rotation between tomato crops gives time for debris to decay and prevents the carry-over of primary inoculum which could initiate new epidemics. The efficacy of good general hygiene practices combined with chemical treatment are under evaluation.

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