LATENT INFECTIONS OF *MONILINIA* IN PEACH ORCHARDS OF MACEDONIA, GREECE

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Abstract

Brown rot, caused by the fungi of genus Monilinia, is one of the major diseases of the peaches worldwide, especially in humid areas. The purpose of this work was to investigate the existence of the latent infections in three nectarine cultivars (Venus, Fantasia, Tasty Free). In addition, the effect of spray applications in reducing the percentage of latent infections of nectarines was examined.

It was found that latent infections were detected in fruits collected on 23 May (Venus 3.6%, Tasty Free 13.4%, Fantasia 20.8%) and 23 June. (Venus 10.2%%, Tasty Free 14.7%, Fantasia 25.6%). In contrast, no latent infection was found in fruits collected on 8 June. The results also showed that trees sprayed on 2 June showed significant lower percentage of latent infections than those sprayed on 15 May. Similarly, the sprayed trees showed significant lower percentage of fruit rots in comparison to untreated control with those sprayed on 2 June had the lowest.

This study confirm the existence of latent infections in nectarine cultivars. In addition, the results of this work showed that a spray of nectarines in early June can significantly reduce the percentage of fruit rots peaches caused by the fungi of the genus Monilinia.

Key words: *Monilinia*, disease, peach,

INTRODUCTION

Brown rot, caused by the fungi of genus *Monilinia*, is one of the major diseases of the peaches worldwide, especially in humid areas. Problems from this disease occur mainly in the flowering stage, the stage of ripening fruit and over the maintenance of fruit. Although this pathogen does not cause serious damages from the fall of the petals to the stage of ripening fruit, related publications have demonstrated potential latent infections, which indeed seems to play an important role in the development of the disease (Emery *et al*. 2000; Luo and Michailides 2001a,b; Luo *et al*. 2005). Similarly, correlation between latent infection in immature plum fruit and fruit rot incidence at harvest was reported in Ontario, Canada (Northover and Cerkauskas 1994).

The purpose of this work was a) to investigate the existence of the latent infections, and b) to examine the effect of spray applications in reducing the percentage of latent infections of nectarines.

MATERIALS AND METHODS

The overnight freezing incubation technique, described by Luo and Michailides (2001a,b), was used to detect latent infections in three peach ('A37', 'Andross', 'E-45') and three nectarine cultivars ('Venus', 'Fantasia', 'Tasty Free'). All trees were established in the experimental field described above. There were 5 replicated trees in a randomized arrangement for each cultivar. The spraying programme was that of growers included application of wettable sulfur and captan in April, and wettable sulfur in May.

In addition, spray applications were conducted in different nectarine trees (cvs Fantasia, Venus and Tasty Free) on 16 May and 2 June (different trees). The fungicide used was thiophanate methyl. Again, the latent infections were recorded by using the overnight freezing incubation technique. Identification of pathogen was based on morphological characteristics. There were 6 trees (replications) for each treatment, while 50 fruits were collected from each tree. Unsprayed trees were used as control. In addition, the percentage of rotted fruits in each treatment was recorded in the stage of ripening fruit.

To test significant differences between treatments and interactions, the Generilized Linear Models were applied. Significant differences between treatments were tested by Wald Test at $P = 0.05$.

RESULTS

It was found that latent infections were detected in fruits collected on 23 May and 23 June (Table 1). In contrast, no latent infection was found in fruits collected on 8 June.

The results showed that the percentage of latent infections was significantly lower in the sprayed trees in comparison to untreated control in all cultivars tested. Trees sprayed on 2 June showed significant lower percentage of latent infections than those sprayed on 15 May (Table 2). Similarly, the sprayed trees showed significant lower percentage of fruit rots in comparison to untreated control with those sprayed on 2 June had the lowest.

DISCUSSION

The relationship between the incidence of latent infections caused by *Monilinia* spp. and the incidence of brown rot of peach fruit has been showed in previous studies (Gel *et al.* 2008). Luo and Michailides (2001a,b) demonstrated the usefulness of the risk analysis in decision support system

for disease management. In this study, latent infections were detected only in nectarine cultivars at the pit hardening stage and one month later. In contrast, no latent infection was detected 15 days after pit hardening stage. These results are in good agreement with those published by Luo and Michailides (2001a,b) who showed that the susceptibility to latent infection at bloom stage was at a moderate level, increased to reach to the highest level at about pit hardening stage, subsequently, decreased, reaching the lowest level in early June at embryo growth, and increased again along with fruit development and maturity until harvest. In this study, no latent infection was detected in peach cultivars. An explanation is given by Lee and Bostock (2007) who suggested that quiescence and development of *Monilinia fructicola* infections in *Prunus* can be influenced by phenols present in host tissue and that changes in the redox environment may influence gene expression and differentiation of structures associated with infection by the pathogen.

Table 1

Percentage of latent infections in 3 peach and 3 nectarine cultivars in 2007 and 2008

	Percentage of Latent Infections (%)		
Cultivars	**23/5/2007**	**7/6/2007**	**22/6/2007**
Fantasia	20.8[y]a[z]	0.0	25.6a
Tasty Free	13.5b	0.0	14.7b
Venus	6.6c	0.0	10.2c
A37	0.0d	0.0	0.0
Andross	0.0d	0.0	0.0
E-45	0.0d	0.0	0.0

	Percentage of Latent Infections (%)		
Cultivars	**23/5/2008**	**7/6/2008**	**22/6/2008**
Fantasia	23.2a	0.0	29.2a
Tasty Free	16.6b	0.0	17.3b
Venus	10.1c	0.0	11.4c
A37	0.0d	0.0	0.0d
Andross	0.0d	0.0	0.0d
E-45	0.0d	0.0	0.0d

[y]Estimates are based on 5 replicates, each of 20 fruit.

[z]Values in the same column followed by different letters are significantly different ($P < 0.05$) according to Wald Test.

Table 2

Effect of early spray applications in controlling latent infections and fruit rots

	Percentage of Latent Infections (%)		
Cultivars	**Control**	**16 May**	**25 May**
Venus	11.5 c	8.2 def	1.8 g
Fantasia	20.7 b	10.3 cde	5.7 f
Tasty Free	26.1 a	12.2 c	7.2 ef
Mean	19.43 A	7.57 B	4.9 B

	Percentage of Rotted Fruit (%)		
Cultivars	**Control**	**16 May**	**25 May**
Venus	28.6 a	23.2 b	16.2 c
Fantasia	20.4 b	15.1 c	11.6 d
Tasty Free	30.8 a	20.2 b	16.5 c
Mean	26.6 A	19.5 B	14.8 C

[y]Estimates are based on 6 replicates.

[z]Values in the same column followed by different letters are significantly different ($P < 0.05$) according to Wald Test.

The relationship of latent infections with the percentage of fruit rot shows the importance of developing control methods. As reported above, control of latent infections is still under investigation. According to Michailides *et al.,* (1995) sprays in early summer were effective in reducing brown rot of prunus at harvest and suggested possible effects on latent infection that occurred early in the season.

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