Calcium hydroxide against apple canker (Nectria galligena)

Kalziumhydroxid gegen Obstbaumkrebs (Nectria galligena)

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Zusammenfassung

Anwendung von 3x 50 kg/ha ungenutzte Lagerkalk (Kalziumhydroxid) in Blattfallperiode verringert die Anzahl von krebsbefallenen Zweigen im darauf folgenden Juni mit maximal 40%. Nicht oder weniger effektiv zeigte sich Baumanstrich, benutzte Lagerkalk, Landbaukalk, Schachtelhalm Tee, Mikroorganismen oder Wasserglas.

Introduction

Apple canker is one of the most harmful diseases in organic apple growing in the Netherlands. It causes the loss of branches or whole trees and rot in apples. At present, growers aim primarily at reducing the infection pressure. Despite all the time invested in pruning out apple canker infections, many growers do not succeed in stabilising canker in their orchards. Especially where infection pressure is high, an effective preventative spray against canker would be very welcome.

Method and materials.

From 1996 the Louis Bolk Institute and the Fruit Research Station FPO have carried out field trials to test various substances for their efficacy in preventing canker during the leaf drop period in autumn. Trials were all carried out on Cox's O.P., a susceptible variety. A randomised block design was used. An untreated variant and the conventional fungicide Topsin M (Thiofanate-methyl) were used as references. During the leaf drop period, sporulating cankers were suspended on a line above the trees to achieve a uniformly high infection pressure.

Spraying was generally carried out three times during the leaf drop period. Topsin M was applied 3 times in 1996 en 2 times in 1997 en 1998.

Results

In the trial of 1996 we started out with some "classic" organic sprays such as Equisetum and waterglass; we also used storage lime. The latter product was the only one that showed any results. We reasoned that new storage lime, which consists largely of calcium hydroxide, might be more aggressive and thereby more effective. During the second year we tried to prevent the agent from washing off by adding waterglass, but there was no improvement. During the third year we tried different dosages and tested calcium carbonate again because this is registered as a fertiliser in the EU regulations. Only calcium hydroxide proved to be effective

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against canker. At a dosage of about 50 kg/ha, calcium hydroxide reduced infections to about 50% and therefore reduces hand labour. No negative effects on trees or decomposition of leaf litter have been observed thus far.

Number of cankers per 2 trees in June, the year after spraying
Zahl der Krebszweige auf 2 Bäumen im Juni im Jahr nach der Spritzung

	1996	1997	1998
Untreated = *Unbehandelt*	15 ab	39 a	35 bc
Topsin M (Thiofanate-methyl) 0,1%	4 c	0.3 c	14 a
Tree paste *Stammanstrich* "Silkaben" 1%	15 a		
Used storage lime =*benutzte Lagerkalk* 10 %	10 b		
Equisetum tea =*Schachtelhalm Tee* 0,3 %	13 ab		
Equisetum tea =*Schachtelhalm Tee* 0,6 %	13 ab		
micro organism mix=*Menge von Mikroorganismen*) 0,1 %	14 ab		
New storage lime =*Neue Lagerkalk* =$Ca(OH)_2$ 10 %		17 b	22 a
New storage lime =*Neue Lagerkalk* 10 % + waterglass 0,5%		17 b	
Waterglass =*Wasserglas* 0,5 %		39 a	
New storage lime =*Neue Lagerkalk* =$Ca(OH)_2$ 5 %			17 a
New storage lime =*Neue Lagerkalk* =$Ca(OH)_2$ 2,5 %			23 ab
$CaCO_3$ =*Kalk* 10 %			40 bc
$CaCO_3$ =*Kalk* 5 %			38 bc
$CaCO_3$ =*Kalk* 2,5 %			42 c

*Results in one column followed by the same letter do not differ at a 0,05 level.

Conclusion

Three applications of 50 kg/ha of new storage lime (calcium hydroxide) during the leaf drop period reduced the number of shoots with apple canker during the following June by a maximum of 40%.
Other treatments with tree paste, used storage lime, regular lime, equesetum tea, micro-organisms or waterglass were less effective or ineffective.

Questions for further research

Can the efficacy of unused storage lime (calcium hydroxide) be increased by more frequent spraying or better formulation? (FPO is working on these questions)
Can the same or better results be achieved by applying the agent through sprinkler irrigation if it is too wet to drive with a sprayer?
What are the effects on insect populations in the orchard?

Summary

3 Treatments of 50 kg/ha storage lime (Calciumhydroxid) in leafless reduced the amount of twigs with canker in next year with 40%. Not or less effective were Tree paste, used storage chalk, regular lime (calciumcarbonate), equisetum tea, micro-organisms or waterglass.