The New Zealand Institute for Plant & Food Research Limited

Monitoring effectiveness of wound protectants against Psa-V

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Overview

Three sets of trials

- Potted plants (pre-commercial GA, pre-commercial GB, Hort16A)
- ‘Chieftain’ male plants in the orchard
  - Winter pruning (July 21-24 2015)
  - Spring pruning (November 19 2015)

Assessments

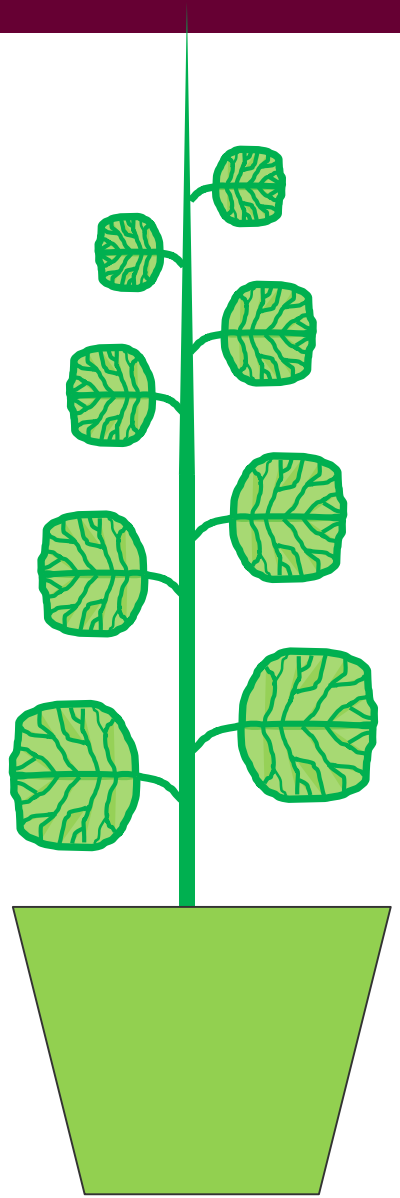
- Potted plants after 11 weeks
- ‘Chieftain’ males after 2 weeks

Chemicals used to treat wounds

Trade name	Active ingredient	% a.i.	Application rate	Application method
Copper sulphate pentahydrate	Copper sulphate pentahydrate	250 g/L (25%)	9.4 kg/L	Paint
Bacseal®	Tebuconazole	10 g/L	undiluted	Paint
InocBloc™ spray	Pine tar	c. 45% pine tar/c. 45% ethanol	undiluted	Spray
InocBloc™ paste	Pine tar	>90%	undiluted	Paint
InocBlock™ mastic	Pine tar	Not supplied	Not supplied	Paint

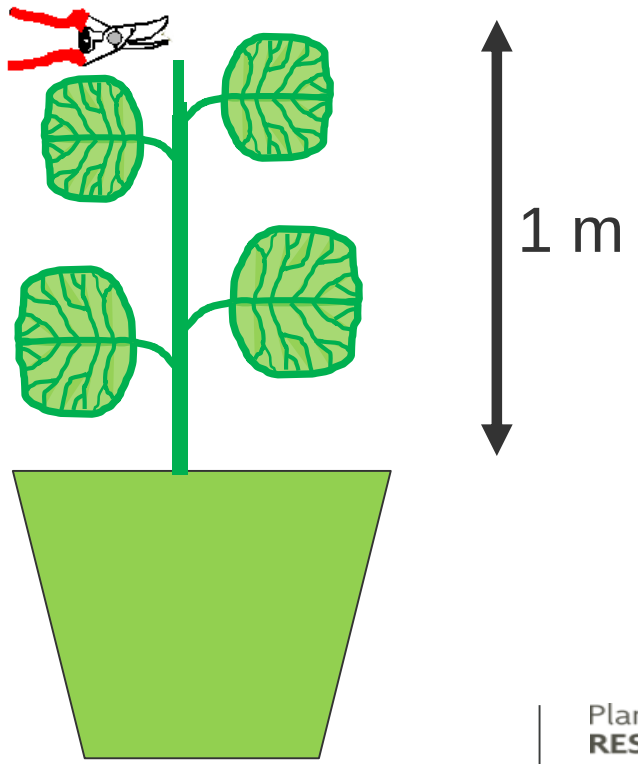
Protocol

» Potted plants



Protocol

- Cut 1 m above soil level
- Applied wound protectants
- Inoculated with two concentrations of Psa-V
- (10^4 and 10^6 cfu/ml)
- 10 plants per treatment



Treatments

GB and Hort16A

1. copper paste
2. Bacseal
3. inoculated control
4. uninoculated control

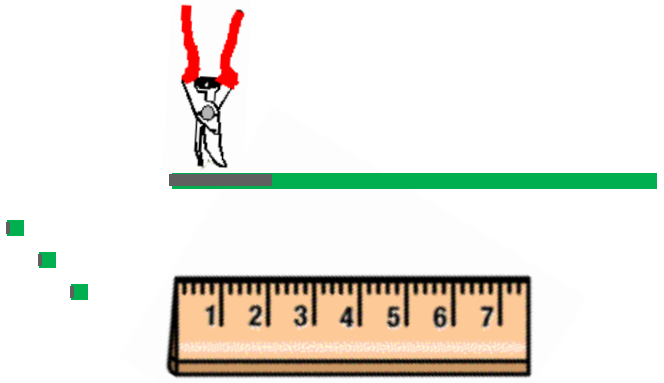
GA

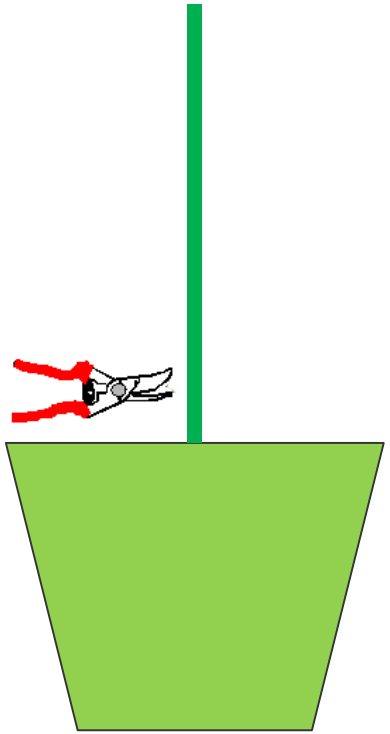
1. InocBloc spray
2. InocBloc paste
3. InocBloc mastic
4. inoculated control
5. uninoculated control

N.B. 12 treatments altogether, those not relevant to Organic growers are not shown

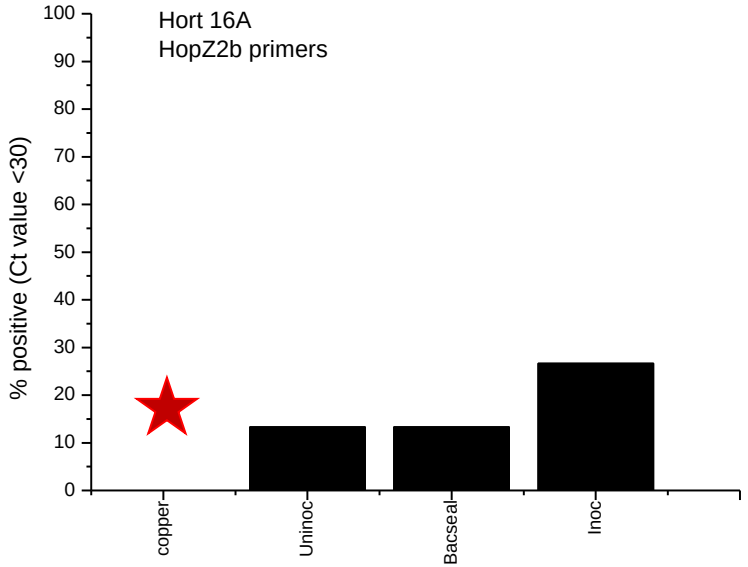
Protocol

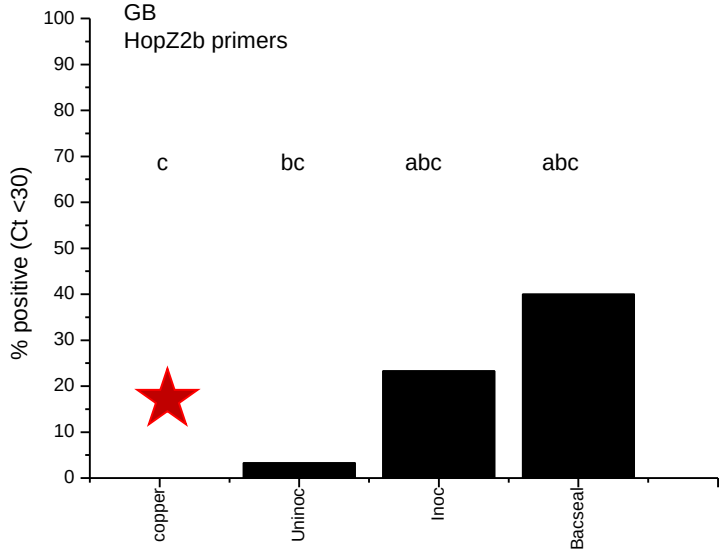
- After 11 weeks
- Cut off vine
- Measured brown staining (lesions)
- Took samples at the wounded end, 5 and 10 cm below the wound
- Extracted DNA and tested with F3/R4 and HopZ2b primers in qPCR reactions

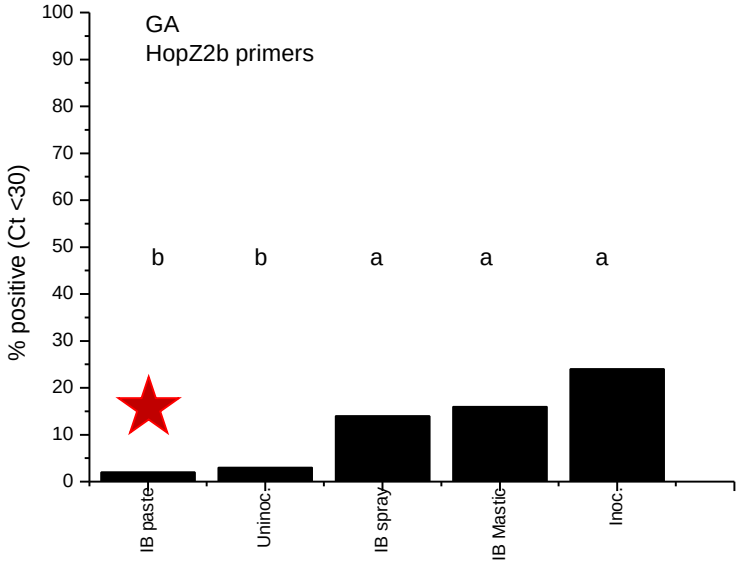




Summarised results







When mean Ct values were analysed, copper paste and InocBloc paste gave significantly greater wound protection than inoculated controls

‘Chieftain’ males in the orchard

Position	Row 1	Row 2	Row 3	Row 4	Row 5	Row 6	Row 7	Row 8	Row 9	Row 10
1a	X	X			8	X	9	X	X	X
1b										
2a	X	X	X	1.1	X	X	X	X	X	X
2b		X	X		X	X		X	X	
3a	X	X	X	X	X	X	X	X	X	X
3b		X	X		X	X		X	X	
4a	X	X	X	2	X	X	10.6	X	X	X
4b		X	X		X	X		X	X	
5a	X	X	X	X	X	X	X	X	X	X
5b		X	X		X	X		X	X	
6a	X	X	X	3.2	X	X	X	X	X	X
6b		X	X		X	X		X	X	
7a	X	X	X	X	X	X	11	X	X	X
7b		X	X		X	X		X	X	
8a	X	X	X	4	X	X	X	X	X	X
8b		X	X		X	X		X	X	
9a	X	X	X	X	X	X	X	X	X	X
9b		X	X		X	X		X	X	
10a	X	X	X	5.3	X	X	12.5	X	X	X
10b		X	X		X	X		X	X	
11a	X	X	X	X	X	X	X	X	X	X
11b		X	X		X	X		X	X	
12a	X	X	X	6	X	X	X	X	X	X
12b		X	X		X	X		X	X	
13a	X	X	X	X	X	X	X.4	X	X	X
13b		X	X		X	X		X	X	
14a	X	X	X	7	X	X	X	X	X	X
14b		X	X	X		X		X	X	
15a	X				X	X	X	X	X	X
15b		X								

N

3.5m

4.2m

N.B. 12 treatments altogether, those not relevant to Organic growers are not shown in the results

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Treatments

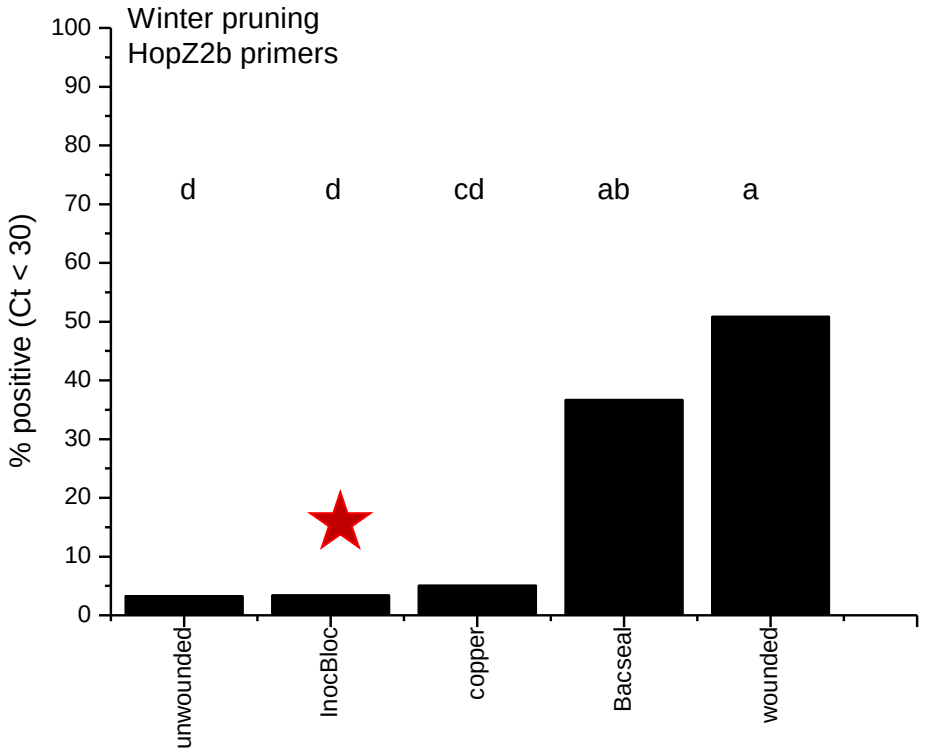
Chieftain males winter and spring

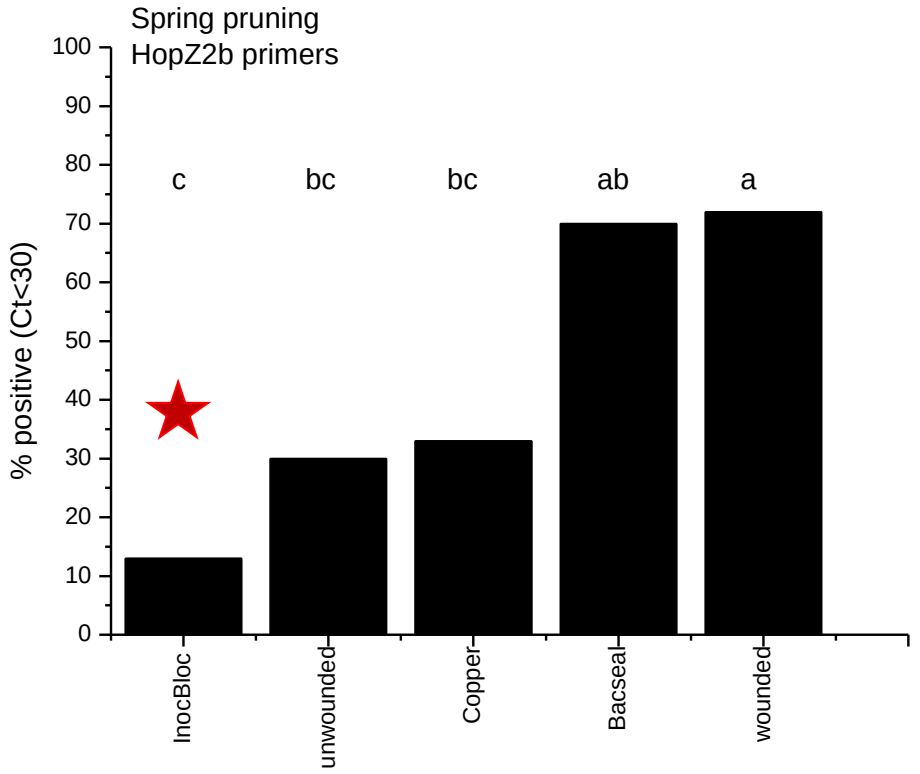
1. Copper paste
2. Bacseal
3. InocBloc paste
4. Untreated wounded
5. Untreated unwounded

Protocol

- Treated in winter and spring
- Took baseline sample just before applying wound protectants
- Treated 5 canes per vine
  - 12 vines for winter pruning
  - 6 vines for spring pruning
- After 2 weeks
- Took samples at the cut end and 5 cm below the wound
- Extracted DNA and tested with F3/R4 and HopZ2b primers in qPCR reactions

Results


Winter pruning
HopZ2b primers
% positive (Ct < 30)
100
90
80
70
60
50
40
30
20
10
0
d
d
cd
ab
a
unwounded
InocBloc
copper
Bacseal
wounded


Spring pruning
HopZ2b primers
% positive (Ct<30)
100
90
80
70
60
50
40
30
20
10
0
c
bc
bc
ab
a
InocBloc
unwounded
Copper
Bacseal
wounded

Summary and conclusion

» Copper paste and InocBloc paste consistently and effectively protected wounds against Psa-V

Copper paste

InocBloc paste

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Chemicals used to treat wounds

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Summary and conclusion

- Copper paste and InocBloc paste consistently and effectively protected wounds against Psa-V
- In untreated ‘Chieftain’ canes 2 weeks after wounding
  - Psa-V increased from 3.3% to 50% (winter)
  - Psa-V increased from 30% to 72% (spring)
- Further testing on ‘Hayward’ and Gold3 (‘Zesy002’) is required
- Testing other formulations of copper is required

Copper paste

InocBloc paste

The New Zealand Institute for Plant & Food Research Limited

Thank you to Zespri Group Ltd for funding

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