

Product testing report

11 November 2011

Kocide Opti®		
Supplying company:	DuPont™	
Active ingredient:	Cupric hydroxide	
Mode of action:	Protectant <input checked="" type="checkbox"/>	Biological <input type="checkbox"/> Elicitor <input type="checkbox"/>
Application rate (per 100L):	Multiple	
Recommended rate in kiwifruit (per 100L):	70 to 90g	

Test results	
Test	Greenhouse seedling tests
Method description	Experiment 1: Protectant (1 June 2011 – 23 June 2011) Bruno seedlings were treated once with the product, either pre-inoculation; where the product was applied and allowed to dry before inoculating with Psa-V (at 10^8 cfu ml ⁻¹ concentration) or post-inoculation. Kocide Opti® was applied at three rates; 1g, 0.75g and 0.5g L ⁻¹ . Assessments were made at weekly intervals after inoculation. The degree of leaf spotting was determined visually using a 0 – 5 scale and is plotted as an 'Infection Score'.
	Experiment 2: Protectant (10 June 2011 – 4 July 2011) Bruno seedlings were treated once with the product, allowed to dry and inoculated with Psa-V (at 10^9 cfu ml ⁻¹ concentration). Kocide Opti® was applied at three rates; 1g, 0.75g and 0.5g L ⁻¹ and partnered with Duwett at 1ml L ⁻¹ . Assessments were made at weekly intervals after inoculation. The degree of leaf spotting was determined visually using a 0 – 5 scale and is plotted as an 'Infection Score'.
	Experiment 3: Protectant (24 August 2011 – 14 September 2011) Bruno seedlings were treated once with the product, allowed to dry and inoculated with Psa-V (at 10^9 cfu ml ⁻¹ concentration). Kocide Opti® was applied at two rates; 0.9g and 2g L ⁻¹ and partnered with Latron at 2ml L ⁻¹ . Assessments were made at weekly intervals after inoculation. The degree of leaf spotting was determined visually using a 0 – 5 scale and is plotted as an 'Infection Score'.
	Experiment 4: Protectant (20 September 2011 – 6 October 2011) Hort16A seedlings were treated once with the product and inoculated two days later with Psa-V (at 10^9 cfu ml ⁻¹ concentration). Kocide Opti® was applied at 0.45g or 0.9g L ⁻¹ , with or without Duwett at 0.33ml or 0.66ml L ⁻¹ . Assessments were made at weekly intervals after inoculation. The degree of leaf spotting was determined visually using a 0 – 5 scale and is plotted as an 'Infection Score'.

Results

Key:

0 = no leaf spotting

1 = up to 10%

2 = up to 25%

3 = up to 50%

4 = up to 75%

5 = 100%

(of leaf area)

Experiment 1:

In Bruno seedlings, Kocide Opti® applied pre- or post-inoculation with Psa-V did not significantly affect leaf spotting at one, two or three weeks after inoculation.

Experiment 2:

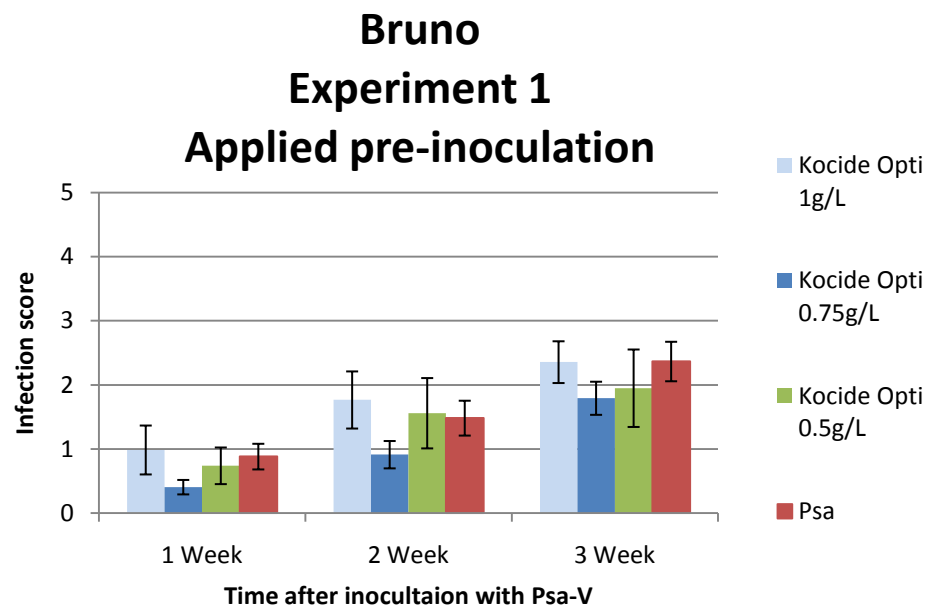
In Bruno seedlings, Kocide Opti® applied at 0.5g L⁻¹ and partnered with Duwett reduced leaf spotting, with significant reductions at one and three weeks after inoculation.

Experiment 3:

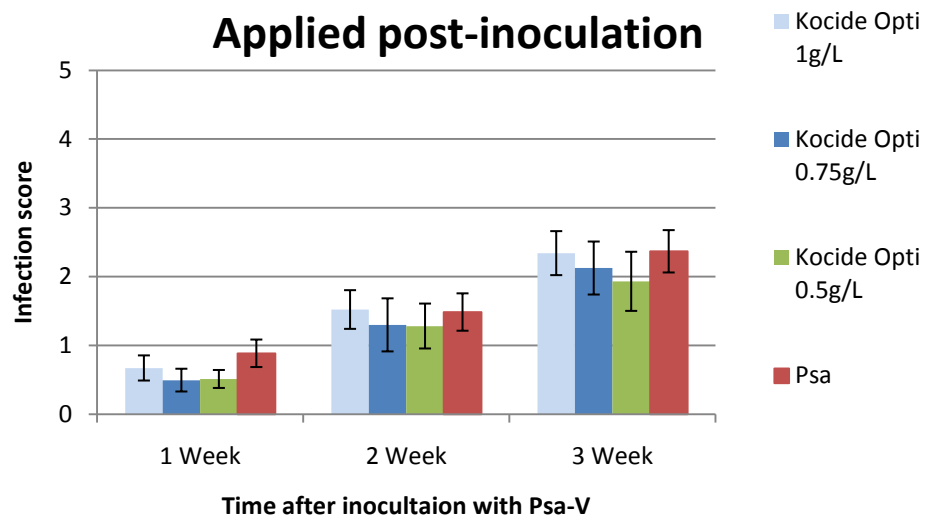
In Bruno seedlings, Kocide Opti® partnered with Latron reduced leaf spotting. Leaf spotting was significantly reduced at one, two and three weeks after inoculation when Kocide Opti® was applied at 2g L⁻¹.

Experiment 4:

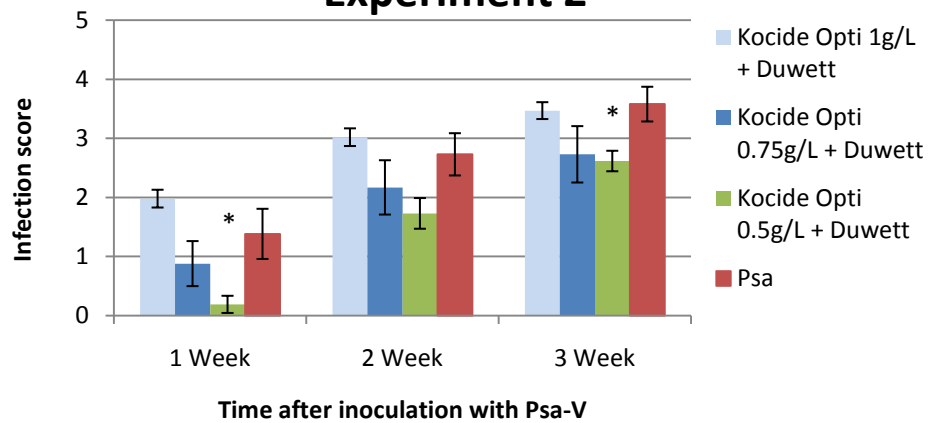
In Hort16A seedlings, Kocide Opti® applied at 0.9g L⁻¹ partnered with Duwett at 0.66ml L⁻¹ and Kocide Opti® applied at 0.45g L⁻¹ partnered with Duwett at 0.33ml and 0.66ml L⁻¹ significantly increased leaf spotting one week after inoculation. Two weeks after inoculation, leaf spotting was significantly increased by all treatments, apart from Kocide Opti® applied at 0.45g L⁻¹ partnered with Duwett at 0.66ml L⁻¹ and Kocide Opti® applied at 0.9g L⁻¹ partnered with Duwett at 0.33ml L⁻¹.



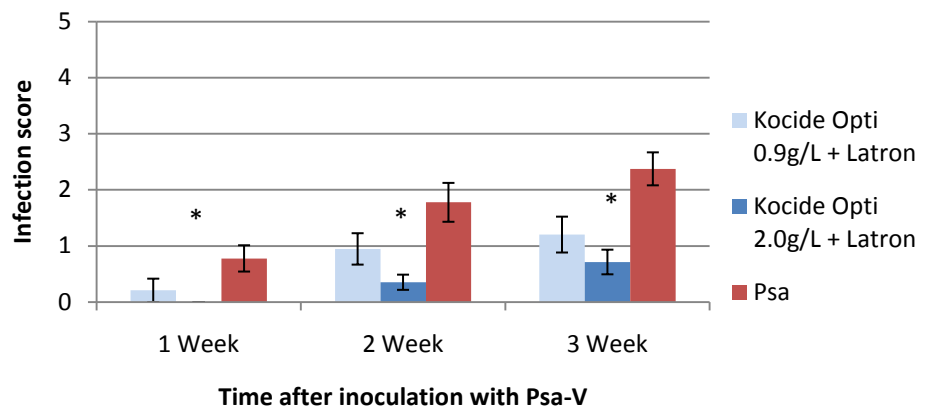
Bruno Experiment 1 Applied post-inoculation



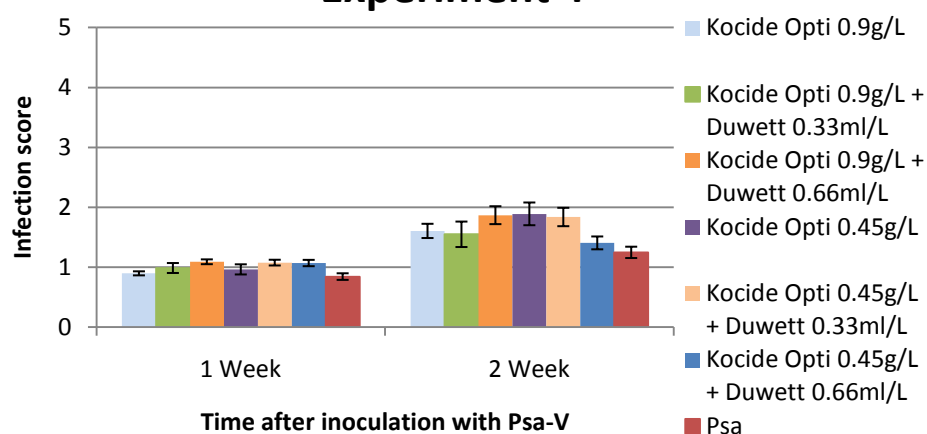
Bruno Experiment 2



Bruno Experiment 3



Hort16A Experiment 4



* Psa inoculated control and the treatment are statistically significantly different at the 5% level

Summary

Kocide Opti® demonstrated some efficacy in reducing leaf spotting in Bruno seedlings inoculated with Psa-V. However, results were inconclusive and further testing in in-pot field trials is planned.

Comments

A standardised screening protocol has been used to test products for efficacy against Psa-V to enable a high throughput of products. Protectant, biological or elicitation tests may be performed, depending on the mode of action of the product. Protectant tests involve the product being applied to the plant with inoculation following on the same day, once the product has dried. Biological tests involve the product being applied two to three days prior to inoculation with Psa-V. Elicitation tests involve the product being applied to the plants seven to ten days prior to inoculation with Psa-V. Assessments of leaf spotting are performed at weekly intervals after inoculation. This method has largely involved testing products using information provided on the product's label. In the future, products may be retested using protocols provided by supplying companies. Products which have previously shown some level of efficacy will be given priority for re-testing.

Data are presented for all assessment timings; however, evaluation of results is largely focussed on the final 'three week' assessment data. Disease symptoms will be better developed by this time and earlier assessments are considered to be less reliable. However, in the case of some elicitors, it is possible that the elicitation effect has been expended and that poor results at the 'three week' assessment time indicate reduced efficacy as a result of insufficient frequency of application.

Results from greenhouse trials primarily serve as a screening tool to determine products that will progress to field trials. Care should be taken when extrapolating results to field conditions. Results in the field may differ due to different environmental conditions and differences in plant material.

Note – leaf spotting may not necessarily mean the plant is infected. It simply indicates that the plant has been challenged by Psa.

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