



Psa vine infection and change in symptoms expression after monthly Actigard™ applications

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It has proven very challenging protecting kiwifruit vines from Psa by spraying them with protectant sprays. The main issue is around plant coverage, often not easily achievable and thus limiting the effectiveness of the treatment. There is a need for repeated applications as rain washes products off, new growth develops, and new wounds are being formed. This adds considerable cost and complexity to management, both in spraying and

reorganising orchard activities to ensure spraying complements other activities to minimise infection risk.

While protectant sprays will likely always be important to provide control and to reduce inoculum loads, protecting vines from the inside, by helping them defend themselves against infection, is also a worthwhile strategy to pursue.

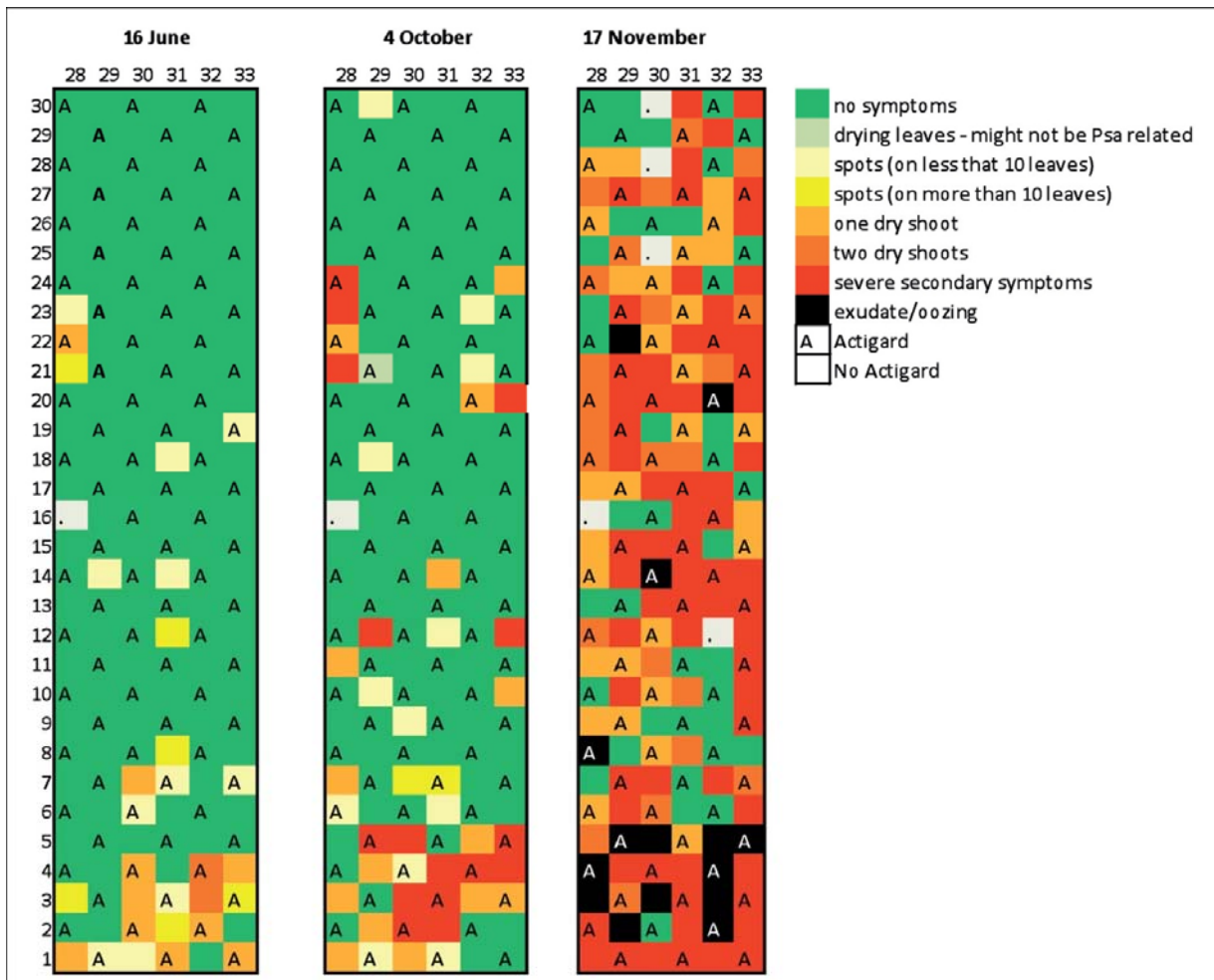


Figure 1. Map of the orchard with symptoms from June to November. Note that the secondary symptoms were removed end of October by the grower.

Plants can naturally defend themselves against bacterial attack by producing salicylic acid. Salicylic acid is a signaling molecule involved in systemic acquired resistance in which a pathogenic attack on one part of the plant induces resistance in the other parts. To help the plant defend itself better, some molecules can be used to activate the salicylic acid production or replace the role it plays. Those molecules are called elicitors or activators. Actigard™ contains one of them: acibenzolar-s-methyl.

ZESPRI has conducted a number of trials to assess the effectiveness and any side effects of using Actigard™ in Hort16A orchards. In the trial reported here, Actigard™ was applied monthly on a Hort16A orchard from June to October 2011 and through to autumn (five applications in total) to assess what impact it could have on prevention of the disease and symptoms evolution. To allow a large number of vines to be treated and a meaningful assessment for symptoms to take place, the application was made through root drenching. The vines were also requiring Serenade Max® applications to the foliage.

A total of 179 vines were included in the trial. Each vine was treated at a rate equivalent to 140g/ha of Actigard™.

At the time of first application, there was already some level of infection through the orchard. Further assessments of vine health status were made in October and November 2011 (see Figure1).

A relatively slow evolution of the disease has been observed through summer followed by a quick spread of the disease after harvest and entering into autumn, when more rainfall and lower temperatures occurred. If symptoms seen initially were mainly spots, further assessments revealed an increased incidence of secondary symptoms and exudates started to show in November 2011 (see Figure 2), even after the grower had been removing dead canes after harvest, around the end of October 2011.

ASSESSMENT OF VINE HEALTH STATUS

At the beginning of the trial, infection levels between Actigard™ treated vines and control vines were similar (see Figure 3) with 85 percent of healthy vines and no vines showing any severe secondary symptoms.

October 2011 assessment gave encouraging results as Actigard™ treated vines were showing a higher number of vines remaining free of

symptoms (78 percent against 62 percent) and lower number of vines showing secondary symptoms (7 percent against 11 percent) as per Figure 3.

However, in November 2011, even though Actigard™ treated vines were still performing better in terms of secondary symptoms (30 percent against 47 percent), the percentage of vines remaining free of symptoms dropped dramatically.



Figure 2. Symptoms of exudates showing mid-November 2011

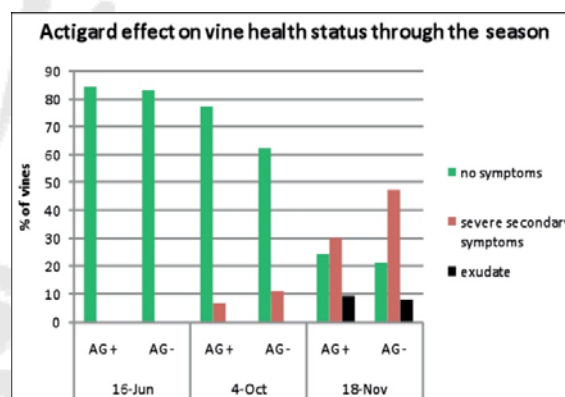


Figure 3. Status of vine health from June to November 2011

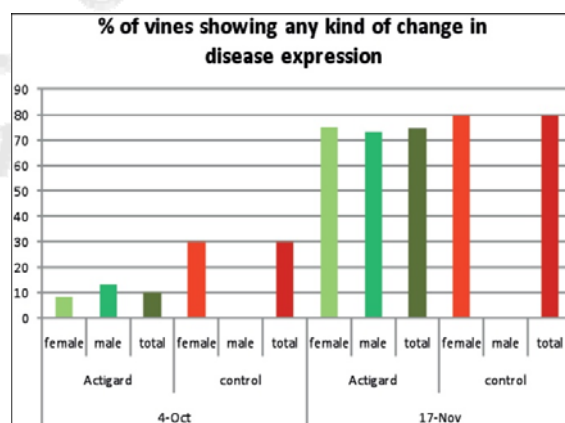


Figure 4. Symptoms evolution throughout the season. Each bar shows the percentage of vines going from no symptoms to any kind of symptoms, or displaying worse symptoms than in June 2011. NB. No males were located in the control vines.

	Between 16 JUN and 4 OCT		Between 16 JUN and 18 NOV	
	AG +	AG -	AG +	AG -
no symptoms -> spots	1	7	0	0
no symptoms -> one dry shoot	1	7	19	9
no symptoms -> severe secondary symptoms	3	5	34	47
Spots -> one dry shoot	1	3	1	0
Spots ->severe secondary symptoms	1	3	5	10
One dry shoot -> severe secondary symptoms	2	2	5	5
TOTAL	9	27	64	71
%	10%	30%	74%	80%

Figure 5. Evolution of symptoms for Actigard™ and control vines through the season

ASSESSMENT OF DISEASE EXPRESSION

Another way to look at the data is to assess the development of the disease i.e. if the application of Actigard™ would slow down the expression of symptoms.

Again, the Actigard™ applications looked promising in October 2011, with lower evolution of symptoms on vines treated with Actigard™ (around 10 percent against 30 percent). However, in November 2011 strong symptom evolution in both treatment and control were observed (see figure 4).

What is interesting to see however, is that symptom development was slower for treated vines (see figure 5) and the vines were kept healthier longer, even though the number of vines having any kind of symptom evolution was the same by November 2011.

Actigard™ applications showed efficacy in preventing vine infection and slowing down disease evolution through summer but in this trial showed limited efficiency on the Hort16A orchard in high inoculum load context when coming into autumn.

Why Actigard™ was unable to protect vines from Psa after harvest is unclear. It may be that it was suppressing symptom expression over summer but was unable to sufficiently activate the vine to changing conditions in autumn in this orchard. Higher rates of Actigard™ and of foliar applications may have provided a different response. Hort16A is also one of the more prone varieties to Psa and Actigard's™ response on less susceptible varieties may be capable of protecting them through the more vulnerable autumn and spring periods. Growers need to be conscious that the use and optimisation of Actigard™ is in its infancy. In this trial no significant effect on fruit size of quality was seen, however in other trials this has been noted. Further trials are planned to better understand how

to optimise its use in Psa control and to understand, and minimise, any negative impacts it may have on the vines performance.