

Agrizest[®], another weapon in the armoury to manage PSA

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Agrizest treatment can reduce the risk factors that predispose Kiwifruit to PSA infection by strengthening the kiwifruit vines' repair, growth and defence (immune) system.

Production of disease resistant essential oils.

Agrizest treated plants deliver the benefits by activating and sustaining the plants internal system that produces a range of essential oils (phenylpropanoids). Laboratory tests have shown that a group of essential oils, the flavonoids^[1] can help plants to resist bacterial diseases.

Repair of climate related damage to plants.

Cold frosty or wet windy conditions can be conducive to PSA disease.^[2] Treatment of plants immediately after frost or wind damage helps the plant to repair damages and recover quickly.

The photos below show how the Agrizest treated vines recovered from frost damage and at blossom time had full healthy canopy. The untreated block has not fully recovered; poor canopy cover and smaller leaves are evident.



The data below shows that application of agrizest on a block that was damaged in the 2006 spring frost overcame the frost damage stress and delivered higher OGR than the unfrosted control block.

Orchard	Control (Healthy Block)	agrizest[®] (Frost damaged block)	OGR Increase per hectare
Basset Orchard	\$48,209	\$52,366	\$4,158

Agrizest elicits the vines repair, growth and defence (immune) system to overcome the stress and damages caused by weather conditions. The healthier plants can resist disease and the trial data above proves that the treatments are not a cost bleed but substantially improve OGR.

Moderates high nutrient toxicity.

Survey of other types of fruit orchards provides evidence of higher incidence of bacterial disease in orchards that have high nutrient levels^[3].

The kiwifruit industry has for the last 25 years been applying very high levels of nutrients. The table in the next page ^[5] confirms that toxic levels of fertilizer are being applied in kiwifruit orchards.

Example of annual fertilizer nutrient inputs for different orchards with estimated quantities removed with harvested crop (in parenthesis)						
Orchard type	Yield (t/ha)	Nutrient applied (kg/ha)				
		N	P	K	S	Mg
Hayward	45	226 (83)	72 (11)	405 (144)	162 (9)	83 (7)
Apples	70	30 (29)	10 (6)	30 (168/)	-	2 (6)
Grapes	13	5 (18)	0 (4)	0 (33)	-	2 (1)

Increasingly premature leaf fall in orchards is occurring due to fertilizer induced high soil salinity and nutrient/soil interaction problems.

Agrizest treated blocks resist premature leaf fall. Agrizest treatment elicits essential oils which belong to the group isoflavonoids and flavones^[8] which moderates the root uptake of nutrients.

The photos below from the Agrizest treated and control block demonstrates that agrizest treatment can resist high nutrient level induced premature leaf fall.



The above photos were taken on 19th May 2011. The control blocks (right side photo) lost their leaves at the end of March / early April and the open canopy allowed sufficient light for grass to grow beneath the canopy.

Agrizest treated block (left photo) leaf fall has been delayed until May. Very little grass growth is evident in the agrizest treated block.

Agrizest can reduce high soil nutrient stress factors which are known to promote bacterial infection.

Alternative to foliar nutrient sprays.

High levels of aluminium, iron, phosphate and potassium ^[4] in the leaf tissue predisposed plants to bacterial disease.

Phosphate and potassium application on leaves can evoke the same immune reaction as PSA^[4]. The primed system could predispose the vine to disease.

A trial in a high producing orchard showed that application of Agrizest produces over \$7000 improvement in orchard gate return compared to the control block which was sprayed with Nutrikelp. 2011 harvest data

Orchard	Control (Nutri-kelp)	agrizest®	Increase per hectare
Taupiro Orchard	\$39325	\$46521	\$7196

Nutri-kelp is “a NPK fortified foliar fertiliser based on Acadian Seaweed, humic acids and additional minerals and TE’s.”

If Agrizest is used to improve productivity additional nutrient input is not required. This mitigates the risk of foliar nutrients predisposing the vine to PSA infection

Reduce leaf breakdown disorder.

PSA-V is a necrotrophic form of the *Pseudomonas syringae* and therefore feeds on dying or dead tissue. Due to high use of potassium in kiwifruit orchards leaf breakdown disorder is prevalent^{[6] [7]}. The dead tissue may present PSA with an infection site.

Treatment of blocks with agrizest will reduce the incidence of leaf breakdown disorder and mitigate the infection risk.



Trial data below confirm Agrizest treatment reduces the incidences and severity of leaf breakdown disorder.

LEAF BREAKDOWN DISORDER INCIDENCE			
100 Leaves selected / close to 1st wire from leader / leaf above a fruit.			
Incidence Necrotic Leaves			
	CONTROL	AGRIZEST	% DIFFERENCE
TOTAL	48	40	20% Less

There was 20% higher incidence of leaf necrosis in the control block.

LEAF NECROSIS SEVERITY									
CONTROL					AGRIZEST				
	Readily Visible	Look Visible	Search Visible	Clean		Readily Visible	Look Visible	Search Visible	Clean
Total	29	30	19	22	Total	25	33	12	30
					% Difference	13.8%	-10.0%	36.8%	-36.4%

The above assessments confirmed that agrizest® Reduces the Incidence of Leaf Breakdown Disorder as well as the Severity of the Leaf Breakdown Disorder. Application of Agrizest can reduce the risk of PSA infection through the leaf breakdown disorder damaged cells.

If the orchard has a history of very high incidence of Leaf Breakdown Disorder application of 2 sprays at the rate of 20Kg Epsom salts per hectare applied pre blossom will mitigate this problem. Epsom salt can be mixed with Agrizest.

Safer and sustainable option to girdling

Any physical wounding damage to the vine is a risk for PSA infection. Agrizest treatment delivers better quality and yield results than girdling without posing the PSA infection risk.

Girdling,



Trunk Girdle

Cane Girdle

Leaf stress (4 days after cane girdle)

A trial to demonstrate agrizest can lift production of a declining block to a higher OGR than the control block supports this claim.

The Agrizest treated block (declining block) was trunk girdled but not cane girdled. Treated block received only 3 sprays of Agrizest – 2 pre blossom and only 1 post blossom.

The control block was both trunk and cane girdled.

GEMINI ORCHARD (Note; only 3 sprays applied)			
QUALITY CRITERIOR	CONTROL	agrizest®	DIFFERENCE
Bins/hectare	141	123	13% Less
Average Brix	6.4	7.2	higher
Average Dry matter	17.54	17.71	higher
TZG	0.58	0.60	higher
Class 1 Trays/hectare	11124	11625	528 trays more
Orchard Gate Returns	\$42,502	\$43,985	\$1,462 increase

The results above show that even when the label recommended 4th spray was not applied Agrizest treatment was able to lift the “declined” blocks quality and OGR above the healthier control block. Although the yield was 13% less in the Agrizest treated block due to poor replacement cane production the previous year; the agrizest treated block produced 528 trays per hectare more than the healthier control block.

Cane girdling did not result in higher TZG or dry matter production in the control block.

In a young orchard where Agrizest has been used for the last 4 years and no girdling has ever been applied the 3rd harvest yield exceeded 10,000 trays.

2011 harvest data

ORCHARD / BLOCK	NUMBER OF CLASS 1 TRAYS / HECTARE
Hope / H1	10,367
Hope / H2	10,190

The above data shows that Agrizest can promote precocity. Trials on apples support this.

The results support the assertion that agrizest treatment is a safer alternative to girdling for improving fruit quality and production.

CONCLUSION

Laboratory scientific evidence exists to support the claim that the type of essential oils that Agrizest application elicits and sustains in plants can be beneficial against bacterial disease including PSA. However it is not possible to obtain scientifically valid results in the field due to the sporadic nature of bacterial disease. Agrizest strengthens the plants health status, and through the gene mediated system assists the plant to resist infection.

Agrizest is a useful weapon in the armoury to reduce PSA infection risk factors. The range of benefits Agrizest application delivers, offers alternative opportunities to reduce or mitigate risks associated with current orchard management practices and environmental factors that are conducive to PSA disease.

Agrizest based solutions are not a cost bleed on managing PSA because Agrizest application will improve quality and productivity to deliver a substantial increase in OGR.

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