



**Agrizest<sup>®</sup>**

An elicitor for plant health, high quality and sustainable yields



## Celebrating 10 Years of Success



Agrizest is a new-generation, Kiwi technology, invented, tested and proven in New Zealand.

The technology of Agrizest has been locally and internationally recognised:

- A finalist in the NZ Hi-Tech Awards 2007,
- Nominated by international scientists for the World Technology Awards 2013.

As part of the nomination process the technology was peer reviewed by scientists from a number of countries.

The science has been presented at numerous peer reviewed conferences both overseas and here in New Zealand.

We have continued to prove the benefits of Agrizest through commercial scale, scientifically designed, and independently conducted split block trials throughout the last 10 years.

A number of growers have been using Agrizest for 10 years. We are proud to say that these growers are consistently high performers.

Agrizest now has an irrefutable 10 year track record of success.



# Contents

## Part 1

### Introduction

1. What is Agrizest?
2. An Elicitor for Plant Health and Productivity
3. The Role of Phenylpropanoids in Crop Management
4. Proven Benefits
5. Safety and Approvals
6. User Guidance/spray programme

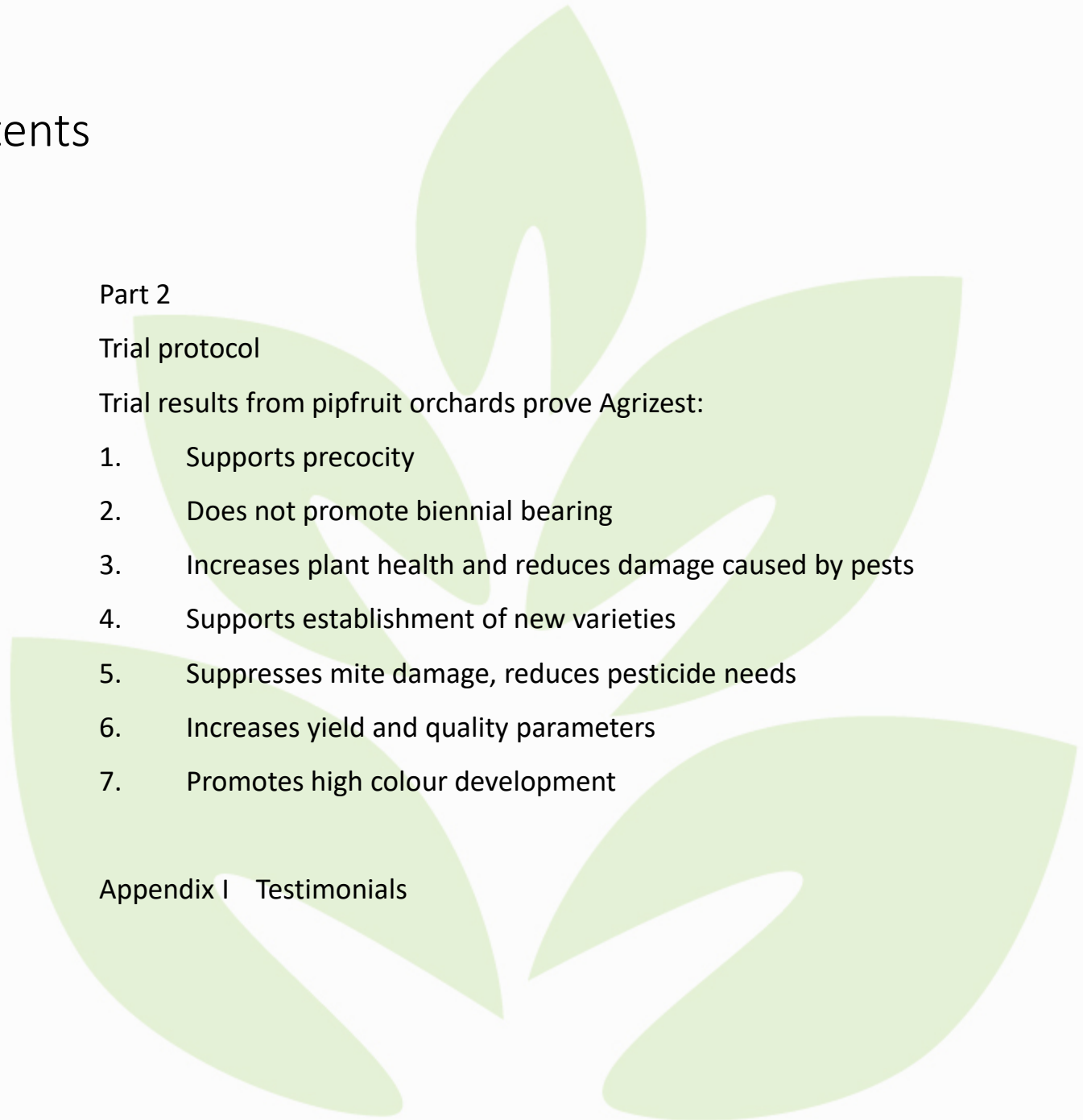
## Part 2

### Trial protocol

Trial results from pipfruit orchards prove Agrizest:

1. Supports precocity
2. Does not promote biennial bearing
3. Increases plant health and reduces damage caused by pests
4. Supports establishment of new varieties
5. Suppresses mite damage, reduces pesticide needs
6. Increases yield and quality parameters
7. Promotes high colour development

### Appendix I Testimonials



# What is Agrizest?

- Agrizest is an elicitor of the phenylpropanoid pathway for plant health: proven to sustain high returns in a range of crops.
- The role of elicitors and phenylpropanoids are becoming more widely understood and appreciated in the horticulture industry. Agrizest already has a 10 year track record of success.
- Agrizest is a unique technology. Agrizest is not a nutrient or seaweed spray with added NPK or hormones.

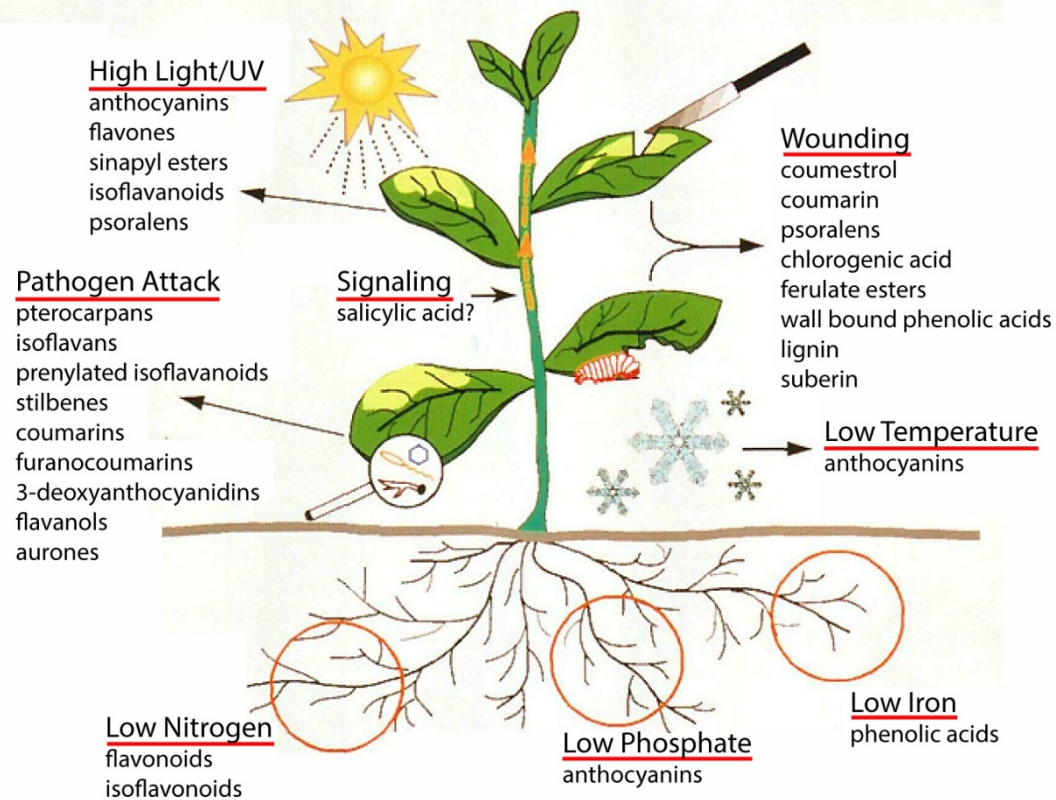
## An Elicitor for Plant Health and Productivity

- Agrizest works indirectly to elicit phenylpropanoids to improve plant health and reduce pest, disease and environmental stress, and damage.
- Agrizest is safe and does not cause phytotoxicity. Using an elicitor like Agrizest, which triggers the plant's own system, allows the plant to regulate its own growth, balance its own internal chemistry and avoids the risk of side-effects and damage while enabling the plant to overcome stress and produce the best crop possible.
- Plant health is an essential part of your integrated management strategy. Agrizest delivers healthier plants that are better able to withstand pest, disease and environmental stress, resulting in increased quality and productivity.
- The combined benefits of plant health, high quality and yield are proven to increase orchard returns.

### Agrizest:

- Reduces pest and disease damage e.g. mite damage
- Reduces and repairs tissue damage e.g. from high winds
- Reduces stress e.g. from heavy cropping
- Reduces physiological problems e.g. bitter pit disorder
- Increases growth - this is not at the expense of crop yield
- Increases yield - but does not decrease quality
- Improves both quality and flavour - evidenced by pack-out data (firmness, colour, weight, starch, brix).

# The Role of Phenylpropanoids in Crop Management



Stress Induced Phenylpropanoid Metabolism, Richard A. Dixon and Nancy L. Paiva 1995 American Society of Plant Physiologists Vol7 pp 1085 - 1097

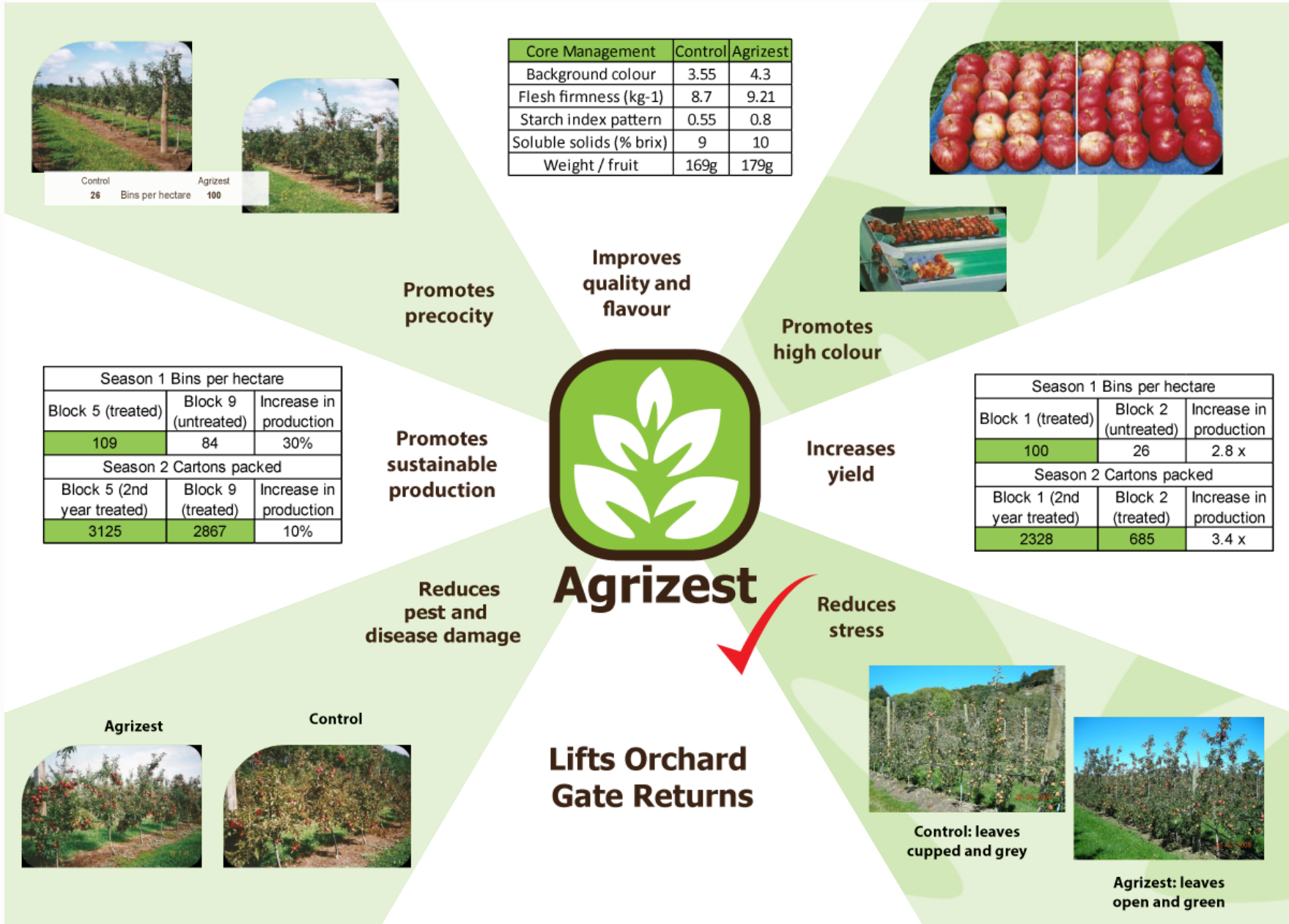
Agrizest is an elicitor of Phenylpropanoids.

Phenylpropanoids (as shown in the chart) are a range of bioactive molecules produced by plants in response to stress from pest or disease attack or environmental changes. Phenylpropanoids are involved in the repair, growth and defence system (immune system).

Some phenylpropanoids are also flavour and colour compounds.

Agrizest is manufactured from various plant derived materials. Proteins, fats and phospholipids are extracted and re-formed so that, when applied to plants, they mimic the attack of pest, disease and environmental stress without causing any actual damage to the plant. The plant reacts to Agrizest applications by producing Phenylpropanoids.

# Proven Benefits



**Agrizest**



**Promotes precocity**

**Improves quality and flavour**

**Promotes high colour**

**Increases yield**

**Promotes sustainable production**

**Reduces pest and disease damage**

**Reduces stress**

**Lifts Orchard Gate Returns**

## Safety and Approvals



Agrizest is manufactured from phytogetic extracts, fatty acids, phospholipids, plant compatible organic acids and wetting agents.

Agrizest has been approved and classified by MPI as an agricultural compound that does not require registration as it is not a pesticide or hormone.

Agrizest can be used on all crops with no withholding period and no waiting period.

Agrizest is BioGro certified.



# User Guidance and Spray Programme

The Agrizest spray programme has been scientifically developed based on years of field trials.

You can be sure how much to apply and when to apply it. We know that best results are achieved when Agrizest is applied at a rate of 1L per hectare.

Agrizest must be applied 4 times per season: at key stages of physiological development - timing is key.

All 4 sprays are required to maximise improvements in both yield and quality.

\* No wetting agent required.

\* Water rates: dependent on sprayer and canopy - ensure product application rate is 1L per hectare. Typical rates: 1 litre of product to 500-1000L of water per hectare.

\* Compatibility: Agrizest is compatible with most commonly used orchard sprays. Combinations should be tested prior to use. Always read the label.

\* Agrizest can be sprayed on days when it is breezy or rain is expected - when other sprays, such as pesticides cannot be used. This is because Agrizest is effective on leaf contact, does not require full cover, and does not require drying time.

## 2 Sprays at petal fall:

- Rate: 2 sprays of Agrizest at 1L/ha.
- Timing: 1st spray at petal fall.
- 2nd spray 3-7 days later.

## 2 Sprays Post-Blossom:

- Rate: 2 sprays of Agrizest at 1L/ha.
- Timing: 1st spray post flowering.
- 2nd spray 7 days later.



# Trial Protocol

## **Split Block Trials:**

- Large block trials are required to eliminate random errors,
- The total crop is evaluated to reduce sampling errors
- Quality and yield aspects are electronically detected or measured to avoid human subjective assessment errors.
- While statistical analyses are employed where appropriate, our final measure of product success is that the results, quantitative or qualitative, must be obviously different such that the data does not require statistical analysis. We expect the increase in returns to be large so that a grower perusing the data will readily accept that Agrizest has delivered beneficial results.
- The farm gate return per hectare is the true measure of success.

## **Independent Application, Monitoring, Harvest and Packing:**

- Agrizest is to be applied by grower or their contractors.
- Pre harvest testing for harvest clearance is to be carried out by independent laboratories approved by the industry.
- The crop, pest and disease monitoring during the production season are carried out by independent contractors.
- At harvest, the total crop from the test blocks must be graded and packed by an independent pack-house.
- Yield and quality data is to be electronically assessed (generated by the grading and packing machines at the growers' nominated pack-house).

# 1. Agrizest Supports Precocity

Control



Agrizest



This young block was struggling to achieve growth and maturity to enable it to be 'production ready'.

**Observation:** At the start of the production season (3 weeks after fruit set) there was already a significant visual difference in the growth performance of the two blocks.

**•Data - Leaf size index**

Total of 100 leaves	Agrizest Treated Block	Control Block	% Increase
Length	551.2	447.9	15
Width	275.9	237.1	16

Control



Agrizest



**Observations:** Pre harvest photos show that Agrizest has promoted growth as well as production.

**•Harvest data: Bins pre Hectare**

Agrizest Treated Block	Control Block	Increase in Production Factor
100	26	2.8

**Core Management harvested 2.8 times more crop out of the Agrizest treated block.**

## 2. Agrizest Does Not Promote Biennial Bearing



**Data – Yield Packed Cartons**

2 year Agrizest Treated Block Block 17	Previous year Control Block current season Agrizest treated Block 14	Increase in Production Factor
2328	685	3.4

Agrizest supports precocity but does not promote biennial bearing.

Observation: At the start of the following production season (before the Agrizest spray programme has begun) the block described in Trial 1. (i.e. treated with Agrizest in the previous year) carried large amount of blossom, right to the centre of the tree. The flowers were also larger.

We saw in Trial 1 that the Agrizest treated block outperformed the control block. The table above shows that the 2<sup>nd</sup> year treated block again produced a high yield while the early season flowering observations indicate why the block treated with Agrizest for 2 years may have been able to achieve a higher yield than the block only treated for 1 year.

Grower comments: *“The 2nd year treated trees have also responded very well after carrying large crops the previous year with flowering and fruit set markedly improved over non treated blocks. My biggest fear in carrying a large crop like this is that the following year the trees start a biennial bearing pattern, in the treated blocks after a heavy crop they had significantly more flower than non treated blocks with fruit spaced evenly throughout the tree with a reduction in variability in fruit set. The fruit on 2nd year treated trees is more even in size and colour with maturity looking at this stage very even which will significantly help in harvest management. I am looking forward to the packout data to see if there is any change in the size profile over the crop from previous seasons. ”*

### 3. Agrizest Reduces Incidence of Pest Attack And Damage

Control



- Observations: Agrizest suppressed leaf curling midge damage
- **Data - Leaf curling midge % trees infested**

50 Trees / Block Assessed	Agrizest Treated Block	Control Block	% Decrease
Row 2	48%	94%	50%
Row 4	30%	86%	65%

Agrizest



- In the Agrizest treated block a significantly lower number of trees were attacked by leaf curling midge
- **Data - Leaf curling midge severity of infestation index**

50 Trees / Block Assessed	Agrizest Treated Block	Control Block	% Decrease
Row 2	45	188	76%
Row 4	17	122	86%

- If Agrizest treated trees did become infested the level of infestation is significantly less severe than in untreated trees.

## 4. Agrizest Promotes Investment In New Apple Trees And New Varieties

### Agrizest Removes The Constraints In Jazz Apple Production



- 2 sprays 7 days apart applied at petal fall followed by 2 more sprays applied 2 weeks apart boosted the leaf size and growth of Jazz apple trees.
- The photographs were taken at the end of January.

## Control



## Agrizest



A block of Jazz apple trees showed stress symptoms. The leaves rolled inwards. The foliage appeared “silvery” due to upward rolling on the stressed leaves.

Several rows within the block were treated with Agrizest in mid January.

The photograph on the far left shows the control row, the trees remain stressed, the foliage appears silvery.

The treated rows show signs of recovery from the stress, the leaves had opened out again and the foliage appeared greener and healthier.

The block pictured to the left is now in its second year of Agrizest treatment. The Agrizest treated block is carrying a larger crop and the trees have grown more compared to the untreated block (far left).

# 5. Agrizest Suppresses Mite Infestation and Reduces the Need for Pesticides.



**Data – 9th January**

50 random leaves / block	Agrizest Treated Block	Control Block	% Increase
Total count mites	12	75	84%



**Data – Pre Harvest / 28th February**

50 random leaves / block	Control Block	Agrizest Block	% Reduction
Total count mites	124	68	82%

Three sprays of miticide had to be sprayed in the control.

No Miticide was required in the Agrizest block.

# 6. Agrizest Improves Yield and Quality

Control

Agrizest



- Observations: Agrizest treated Block (Block 3A) produced larger fruit. There was more colour and the intensity of colour was also greater.
- **Data: Pre harvest maturity test.**

	Agrizest Block 3A	Control Block 3B
Colour Index	4.9	4.7
Firmness	10	8.7
Starch Index	1.65	2.3
% Brix	11.4	11.6
Av. Weight	173.5g	164.0g
	Agrizest Block 5	Control Block 9
Colour Index	4.3	3.55
Firmness	9.2	8.7
Starch Index	0.80	0.55
% Brix	10.0	9.0
Av. Weight	179.0	168.5

**Harvest data: Bins pre Hectare Block 5 vs 9**

Agrizest Treated Block	Control Block	% Increase in Production
109	84	30%

Four sprays of Agrizest increased production by 30% compared to the control block.



## 7. Agrizest Promotes Excellent Fruit Quality and High Colour Grade.



This orchard (Core Management in Waikato) achieved 96.2% pack out in high colour grade.



Clockwise from top left – Braeburn, Galaxy, Granny Smith, Pack house.

# Grower Testimonials

## Observations From CORE MANAGEMENT on Agrizest trial 2005

Initial trials were established in 2005 on 7 separate blocks of apples. Varieties included Royal Gala, Galaxy, Aurora, Granny Smith predominantly on M9 and CG 202 rootstock. Trees are approx 3 to 4 years old on Matangi clay loam planted at 1778 trees to ha except for Granny Smith planted at 740 /ha. Blocks were split in half with one half used as control the other the trial area. Spraying of product was carried out as per instructions ( 4 applications in total). In all other regards trees received identical management.

Photographic evidence supports our observations of increased tree growth in the trial areas, which we are trying to encourage in a young block. Also fruit size and yield were increased noticeably in the trial blocks (unfortunately due to the small size of the trial area separate packhouse data was not able to be separated out from the main crop, a larger trial area will rectify this).

The trees in the trial area also had a significant reduction in mite populations compared to control blocks. So much so that miticide was not sprayed in trial blocks compared to up to 3 applications of miticide on control blocks to control outbreak. Also in the aurora block a significant reduction in the incidence of bitter pit was observed just before harvest compared to control blocks. Fruit finish was also excellent with no incidence of russet.

Trees sprayed in trial blocks generally had “healthier” looking leaves with deep green shiny leaf surface and reduced incidence of wind rub type damage or nutrient deficiency symptoms.

Paul Christey, 76 Windmill Rd, RD 3 Hamilton, Phone 07 858 2428, 0274 749 771

## Observations From CORE MANAGEMENT on Agrizest Commercial Application season 2006/07

Hi Nathan,

I have completed an estimate of bins per block and I'm not sure if the figures are right after comparing them to last years actuals?? For example Braeburn block F 2 is showing a five fold increase in production ,normally to double production in a young dwarf block is satisfactory production increases in 4 and 5 year old trees. I will be very interested to see if estimates turn into reality!! Overall the orchard estimates are showing almost triple the number of bins from last year and size , quality and colour look to have improved over last seasons crop also.

My biggest problem this year is breaking branches and support posts from all the extra fruit!!! Nathan the crop this year is much cleaner from mites , woolly apple aphid, leaf curling midge, I have not seen any colding moth or leaf roller damage , insect damage is insignificant throughout the whole orchard. This would be the first year in a long time we have not had any insect outbreak of any description that has effected the crop. Fruit finish is excellent with nice bright stripy red in the Royal Gala and deep "waxy" green in the Grannies.

The 2nd year treated trees have also responed very well after carrying large crops the previous year with flowering and fruit set markedly improved over non treated blocks. My biggest fear in carrying a large crop like this is that the following year the trees start a biennial bearing pattern, in the treated blocks after a heavy crop they had significantly more flower than non treated blocks with fruit spaced evenly throughout the tree with a reduction in variability in fruit set. The fruit on 2nd year treated trees is more even in size and colour with maturity looking at this stage very even which will significantly help in harvest management. I am looking forward to the packout data to see if there is any change in the size profile over the crop from previous seasons.

Tree vigour is also very impressive ,dwarf trees if "overcropped" will stop growing and are very differcult to restart normal growth once they stop. My trees, even carrying impressive crop loads have put on 60 to 70cm of new growth evenly over the tree with pruning in most blocks being a quick tidy up or left alone completely till next year with good even spur development occurring.

Nathan I have had so much fun this year using your product, I have made the odd mistake but learned a lot. Can you please develop a product that stops weeds and grass from growing as I can't keep up!

Best Regards

Paul Christey, Core Management,

President, Waikato Fruitgrowers Association

Phone 64 7 85 82 428 , 0274 749 771

