

# AgriLife

*Working in Harmony  
with Nature to  
Promote  
Plant Immune Systems*



*A Natural Alternative to  
Pesticides, Herbicides  
and Fungicides*

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# AgriLife Nutrient Synergist

A citrus bioflavonoid/organic acid complex for stimulating the immune system in plants at risk of damage from pathogenic and pest attack

## A New and All Natural Solution to Old Problems

### 1. Understanding Plants

#### *Phytoalexins*

Plants are capable of defending themselves against viral, fungal and bacteria attack through production of phytoalexins. Phytoalexins are antitoxins naturally produced by the plant.

Phytoalexins are not usually detected in plants as they are not stored. They are produced rapidly (from 1 to 8 hours) once the plant is under attack.

Sometimes, the natural mechanism of the plant is not able to control this attack because the pathogens are able to “swamp” the phytoalexins under abnormal growing conditions.

Reduced production of phytoalexins is due to several factors (genetic changes in the plant) caused by:

1. *Plant stress*
2. *Excessive use of synthetic agrochemicals (pesticides, herbicides, fungicides and synthetic fertilizers)*
3. *Temperature, humidity and climate.*

AgriLife contains bioflavonoids (synergized with organic acids), which act as “elicitors” to activate and enhance the plants production of phytoalexins to counter the risk of damage from pathogenic attack. Increased level of phytoalexins production reduces stress, promoting plant vigour; all these factors result in a healthier plant.

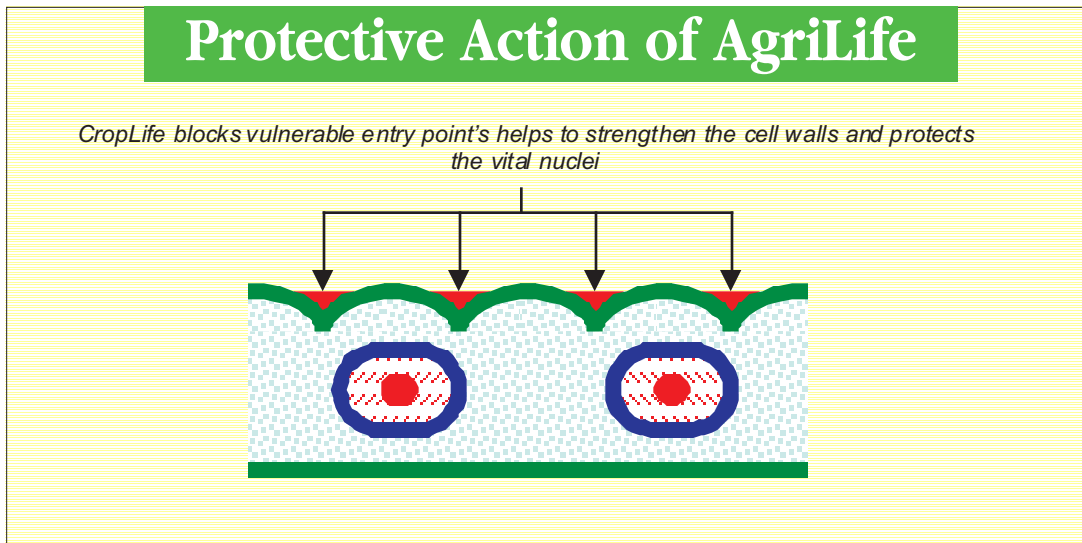
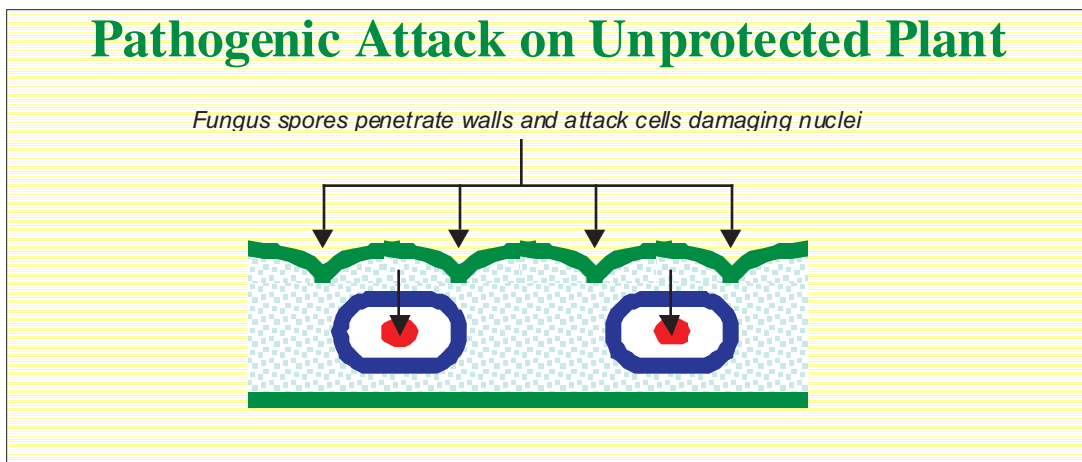
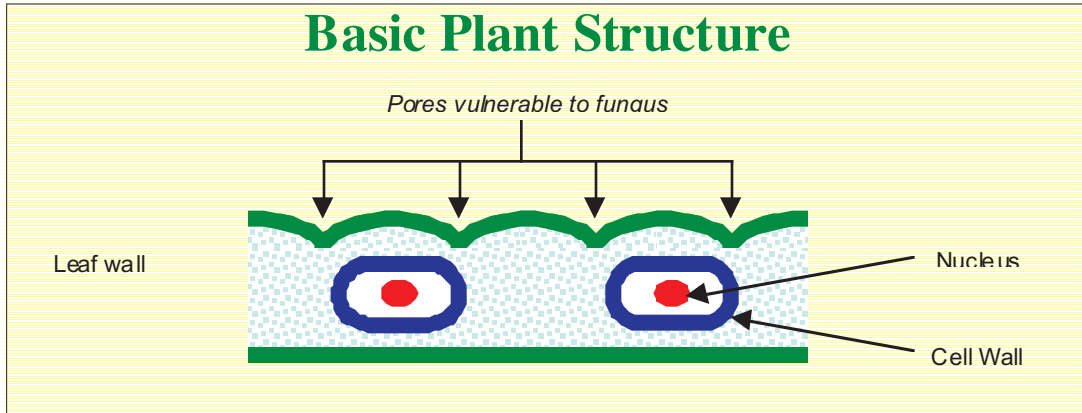
For further details on the function of bioflavonoids and alexins refer to attachments 1 of 2. For mode of action refer to figure 1.

#### *Brix Level*

The brix level is the level of sugar in the plant and is an indication of the health of the plant.

AgriLife not only assists the plant in resisting pest and disease attack by stimulating the production of phytoalexins, it also increases the brix level of the plant at the same time. Within 5 days of treating the plant with AgriLife the brix level of the plant will have increased. The higher the brix level, the healthier the plant, and the better the plant can fight off ***insect*** attack.

Figure 1 AgriLife - Mode of Action



## 2. Examples of plants which have been successfully treated with AgriLife

### CROPS

Chrysanthemums	Birds of Paradise	Hellconiaas
Callas	Roses	Carnations
Gerbera	China roots	Orchids
Bromellias	Petunias	Agloenemas
Apples	Dracaenas	Loterias
Ferns	Asparagus	Tobacco
Chile	Tomato	Potato
Celery	Cabbage	Broccoli
Cauliflower	Cucumber	Lettuce
Melon	Watermelon	Onion
Avacado	Guanabana	Mango
Banana & Plantain	Grape	Palmetto
Guava	Rice	Corn
Sugar Cane	Custard apple	Grapes
Pears	Peaches	

Most crops affected by fungi, bacteria, moulds or virus can be treated with AgriLife.

## 3. Benefits of AgriLife

### **Pre Harvest**

- Activates plants 'own defense systems' to help combat the risk of damage from plant pathogens
- AgriLife is Ecological, Biodegradable and Environmentally Responsible.
- Concentrated formula - a little goes a long way!
- Effective in the presence of organic matter
- As a synergist improves plants uptake of nutrients
- Does not alter the taste of produce, has no irritant odour and has no residual withholding periods when used at manufacturers recommendations.

### **Post Harvest**

- Helps extend shelf-life of fruits, vegetables and flowers reducing or eliminating 'rejects' and or penalties that reduce profitability
- Helps reduce the use of non-organic chemicals (fertilizers and pesticides)

### **AgriLife Benefits**

AgriLife is a new generation product designed to improve plant health in the process enabling the plant to use its own defense mechanism to counter pest and disease pressure.

The benefits include:

- Better quality produce and yield
- Increased longevity for fresh produce

- A reduction in dependency on traditional agrochemicals (fertilizers and pesticides)
- No corrosion to expensive plant and equipment
- Far less impact on the environment
- Increased profitability
- Safer working conditions for workers

#### 4. Typical application program

Time of Application	Application rate per hectare. AgriLife (mls)	Application rate per hectare. Water (lts)
<i>As transplant solution</i>	-	15
<i>10-14 days after transplant</i>	100	400 - 1,000
<i>7 days later</i>	150	400 - 1,000
<i>7 days later</i>	225	400 - 1,000
<i>Thereafter EVERY 7 days to harvest</i>	300	400 - 1,000

**NOTE:**

- Slight variations may occur depending on crop.
- Hectare rate not relevant, seedlings dipped in solution prior to transplanting.

## 5. Tissue Analysis

Product test for key properties	Conventional Treatment: Fungicides Pesticides Fertilizers	AgriLife (Alone)	AgriLife plus Organic Liquid Fertilizer	% Increase over Conventional Product Treatments	
				AgriLife (Alone)	AgriLife Plus Liquid Fertilizer
<i>Protein</i>	10.4%	15.0%	20.5%	44 %	97%
<i>Nitrogen</i>	1.7%	2.3%	3.3%	35%	94%
<i>Calcium</i>	0.25%	0.28%	0.30%	12%	20%
<i>Magnesium</i>	0.15%	0.21%	0.25%	40%	67%
<i>Phosphorous</i>	0.6%	0.65%	0.75%	8%	25%
<i>Potassium</i>	2.7%	2.8%	3.0%	4%	11%
<i>Iron</i>	80ppm	85ppm	100ppm	6%	25%
<i>Manganese</i>	18ppm	20ppm	22ppm	11%	22%
<i>Copper</i>	9ppm	10ppm	11ppm	11%	22%
<i>Zinc</i>	30ppm	35ppm	40ppm	17%	33%
<i>Boron</i>	12ppm	16ppm	18ppm	33%	50%
<i>Sulphur</i>	0.15%	0.17%	0.2%	13%	33%

## Economic Benefits

Product	Plant Maturity	Yield	Chemical Cost Reduction	Shelf-life extension	Organo-lectic
<b>AgriLife (Alone)</b>	3 days early	10% increase	Up to 25%	Up to 50%	Improves taste & texture
<b>AgriLife Invigorator calcium carbonate</b>	5 days early	15% increase	Up to 25%	Up to 50%	Improves taste & texture

## 6. Summary of Benefits

The use of AgriLife alone or in combination with liquid fertilizers (foliar applied) gives a unique replacement package for conventional application of: -

- Pesticides
- Fungicides

This will result in:

- Reduce chemical costs by up to 25%
- Improve produce yields by up to 15%
- Improve plant health

Whilst the major property of AgriLife is for the suppression of diseases via the promotion of the plants \*SAR mechanism, other benefits also occur.

### **\*SAR Mechanism**

Systemic Acquired Resistance via enhanced production of phytoalexins.

### **NOTE:**

Individual programs will be recommended to horticulturists/agronomists depending on location and crop type.



## Attachment 1

### Bioflavonoids and Their Synergistic Effects in Combination with Ascorbic Acid

Bioflavonoids are bio-chemical compounds (polyphenols) that are naturally produced by plants. They have antioxidant and anti-microbial properties, and also help decrease capillary fragility and restore normal permeability of vessels.

Citrus Bioflavonoids are found in citrus plant varieties, e.g. Grapefruit (Citrus Paradise), Bitter Orange (Bergamot), Tangerine (Citrus Reticulata), Sweet Orange (Citrus Sinensis), etc.

- Bioflavonoids in combination with ascorbic acid show synergistic effects in suppressing pathogenic attack and preserving the natural flavor of vegetables and fruits.
- The high reducing power of ascorbic acid gives it the character of a stabilizer towards ready oxidizable substances that are present in the fruit and vegetables. There are also important metabolism relationships between ascorbic acid, other vitamins and enzymes, which manifest themselves in different actions. The micro-biological activity of ascorbic acid, which is based, in particular on inactivation of toxins, is possibly connected with these mechanisms.
- Scientific research, beginning with Prof. Dr. Gyorgyi (awarded nobel prize for medicine) and Prof. Dr. Gabor (discovered the biological importance of bioflavonoids). Gabor demonstrated the synergistic qualities of bioflavonoids when used in conjunction with ascorbic acid. The combination produces:- powerful antioxidants, absorbers of free radicals and significant anti-microbial, anti-viral properties.
- The application of ascorbic acid and bioflavonoids in fruit and vegetables can result in higher growth rates in plants. The ascorbic acid is considered very important and essential in growth promotion in plants.
- It has been discovered that ascorbic acid acts in a positive and beneficial way to the nodulation of legumes, promoting the synthesis of nucleic acids and proteins thus increasing nodule growth. Vegetables treated with ascorbic acid and bioflavonoids increased the concentration of nitrogen into nodules, branches, leaves and seeds. (Chinoy 1984).
- Scientific studies developed by Prof. Dale Norris of Wisconsin University USA has also verified that foliar spraying with low concentrations of vitamin C and bioflavonoids diminished about 70% of the damage caused by insects in soya bean cultivation. Similar positive and beneficial results in beans and broccoli cultivations were also achieved.
- It has also been discovered that Vitamin C and bioflavonoids help to build up leaf protein thus protecting the plants.



## Attachment 2

### AgriLife and the Phytoalexin Effect

Phytoalexins are antimicrobial chemical organic compounds, naturally produced in plants, which tend to accumulate after attacks on the plants by pathogens. Examples of Phytoalexins are: -

Sesquiterpenoids  
Anthocianins

Phenylpropanoids  
Bioflavonoids

Stilbenes  
Isoflavonoids

Furocoumarins

Some chemical products can induce plants to produce Phytoalexins, and these substances are known as Elicitors or Phytoalexin Precursors.

In their fundamental mode of action, Phytoalexins can be compared with animal anti-bodies, but with the following differences: -

- Antibodies are specific to a single disease, whereas Phytoalexins are non-specific.
- Animals produce many types of anti-bodies, each working against a particular kind of microorganism, while plants produce Phytoalexins, which are effective against many types of microorganisms.
- In animals a particular antibody is produced by a specific stimulant (Antigen), whereas Phytoalexins can be produced by several types of stimulant (Biotic or Abiotic).
- Antibodies remain in an animal for life, while Phytoalexins gradually reduce in concentration once the disease attack has been dealt with. It is therefore very important to stimulate the production of Phytoalexins in plants by the use of Elicitors.

Thus the action of Phytoalexins can be seen as an ongoing battle against microorganisms, initiated by a pathogen attack on the plant.

Phytoalexins are not a universal solution to the problem of pathogen attacks on plants, but they are the most powerful weapon against these attacks. When the plant's production of phytoalexins is higher than the degradation capability of the attacking pathogen, then infection does not occur, or its spread is minimal.

Modern agriculture strives continually for higher productivity by means of the intensive use of nitrogenous fertilizers, and by the use of nitrogenous fertilizers and by the use of potentially toxic substances such as Herbicides, Insecticides, Fungicides and Bactericides. All of these techniques are inimical to the natural production of Phytoalexins and it has been shown that plants treated regularly with these substances lose their natural ability to produce Phytoalexins.

Bioflavonoids, and ascorbic acid, both originating in Citrus plant varieties such as grapefruit and oranges, are extremely powerful Elicitors of Phytoalexins, and they form fundamental elements in the make-up of our AgriLife product. As well as their effect as Elicitors for Phytoalexins, they act in combination as stabilizers towards oxidizable substances present in fruit and vegetables.

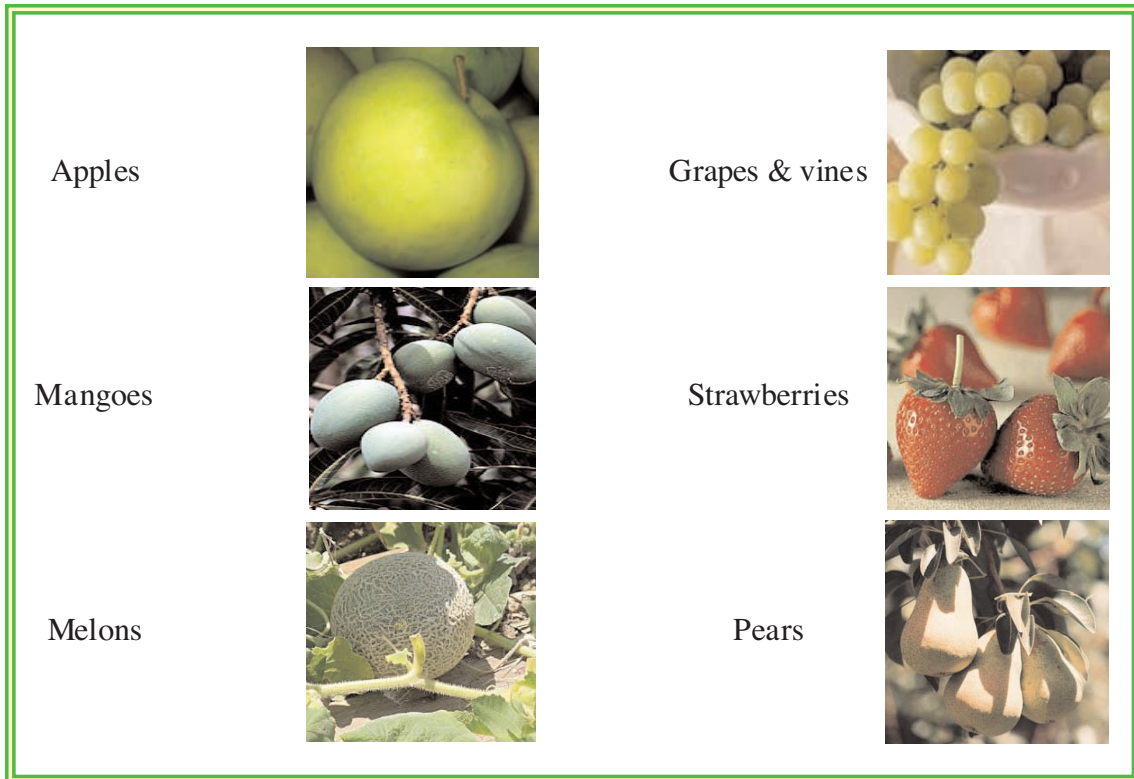
For further information please refer to our document headed "Bioflavonoids and their synergistic effect in combination with ascorbic acid".

## Attachment 3

### Examples of Field Trials

#### Fruit

Many different crops have benefited from AgriLife protection strategies



We offer support to our customers in the development of new cost-effective programs to improve yields and maximize longevity for the harvested crops.

#### Apples (Granny Smith Variety)

Manjimup, West Australia - Post harvest - Treated with AgriLife



##### Application

The apples were post harvest sprayed with AgriLife at a concentration of 2% w/w.

The aim of the program was to dramatically reduce the instance of mould attack on individual fruits and where any mould attack occurred.

##### Benefits

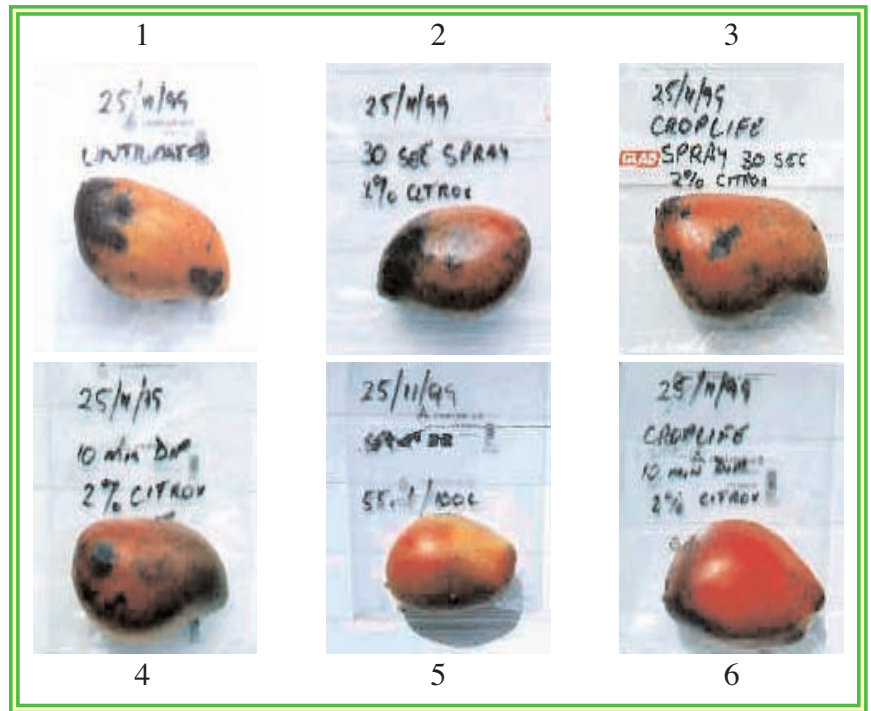
- No observed proliferation of any mould spots.
- No observed instances of cross contamination from fruit to fruit.

The implications on storage (in bins) and subsequent transportation are highly significant where the possible loss of whole consignments can be virtually eliminated by using the AgriLife treatment regime.

## Mangoes

AgriLife was applied at leaf fall, bud burst, once during the season proper or after any rainfall and then two sprays before harvest at 3 weeks and a week before picking. At pack-out, depending on the length of storage for the product, DecoSan-PT was applied at dilutions ranging from 1% - 4% the latter for fruit prone to brown rot.

The DecoSan-PT was applied in line via a re-circulating tank and nozzle sprays with a 2% dilution and topped up half way through with 50% of the original DecoSan-PT solution. The exception to the rule was where fruit for long term CA storage was dipped in a shower spray for 60 seconds with 2% DecoSan-PT DPA mix.



The photographs above show mangoes that have been stored for 7 months in CA. These mangoes were treated with AgriLife in the orchard and DecoSan-PT with DPA in shower dip.

The pictures show results with and without AgriLife Treatments. The controls, untreated 1 and commercially treated 5, are included for comparison. The results show quite clearly that the combined AgriLife treatments (AgriLife and DecoSan-PT) show a significant improvement over the standards 1 and 5.

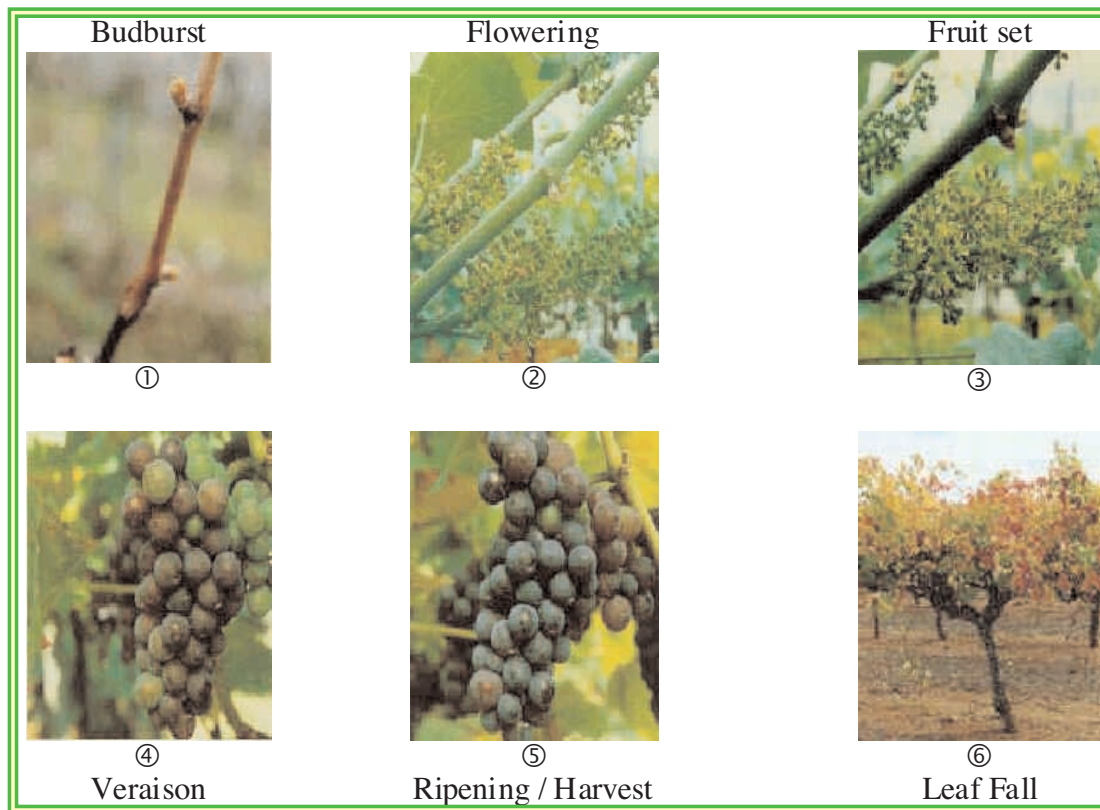
## Melons

Trials were conducted in the USA with a variety of crops on approximately 4 acres. In this area a large amount of calcium (ground limestone) has been applied. The only products used to maintain the crops were AgriLife and the normal fertilizer program.

The combination spray ensured few insects were sighted.



## Vines Trials Carried Out on Semillon Grapes (Australia).



### History

Semillon vines had experienced 'wintering' problems year on year (over a 5 year period) Wood spindling was endemic and as a result yields were not improving at expected rates. Typically they were struggling at 2.5 tonnes / hectare from a starting point of about 1.75 tonnes / hectare.

### Treatment

Started prior to leaf fall (fig 6) from previous 2000-2001 season the next years growth (2001-2002) produced better and more 'robust' wood. Treatment thereafter at intervals as illustrated above (fig 1-5) produced a dramatic increase in yield i.e. improved from 2.5 tonnes / hectare to 4 tonnes / hectare. Tissue analysis also showed significant improvements in protein, nitrogen levels and trace elements (Ca, Mg, P, Fe, Mn, Cu, Zn, B and S).

### NOTE:

Similar results have been achieved on table grapes (4 varieties); Red Dawn, red Globe, Superia and Sultana.

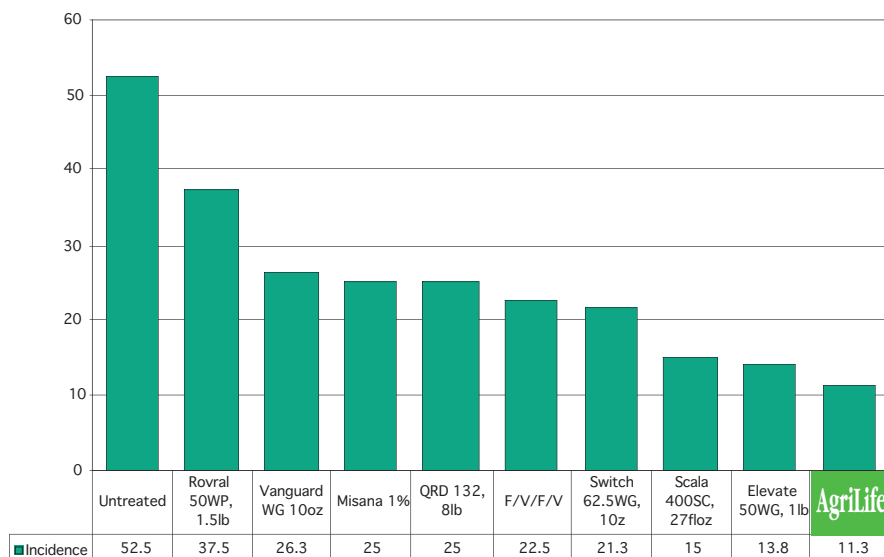
## AgriLife Treated Grapes

Incidence (%) of Botrytis on clusters

NOTE:

The substantial benefit from use of AgriLife with an incidence of only 11.3% compared to the untreated 52.5%.

### Incidence of Botrytis



## Grapes and Vines

AgriLife reduces the incidence and susceptibility of grapes to fungal and insect attack.

Botrytis on cluster				
Treatment, rate/A	Spray timing	Incidence (%)		Severity (%)
Untreated		52.5	a	15.3
Rovral 50WP, 1.5 lb	1, 2, 3, 4	37.5	b	12.3
Vanguard WG, 10 oz	2, 4	26.3	bc	10.0
Milsana, 1% v/	1, 2, 3, 4	25.0	bcd	8.0
QRD 132, 8lb	1, 2, 3, 4	25.0	bcd	10.5
Flint 50 WG, 2 oz	1			
Vanguard 75 WG, 10 oz	2			
Flint 50WG, 2 oz	3			
Vanguard 75 WG, 10 oz	4	22.5	bcd	3.3
Switch 62.5WG, 10 oz	2, 4	21.3	cd	10.3
Scala 400SC, 27 fl oz	1, 2, 3, 4	15	cd	14.3
Elevate 50WG, 1 lb	1, 2, 3, 4	13.8	cd	7.0
<b>AgriLife</b> 4 oz. -Plant Food, 2 gal	1, 2, 3, 4	11.3	cd	7.0

Spray dates and approximate phenological stages for designated spray applications: 1 - 24 Jul (pre-bunch closing), 2 - 16 Aug (pre-veraison), 3 - 15 Sep (post-veraison), 4 - 3 Oct (pre-harvest).

## Strawberries



Unlike most large strawberries AgriLife treated strawberries retain full texture and flavor.

Heavily Laden Clusters



## Result

- Yield increase of 25%
- Significant pesticide use reduction
- Crop to market 3 weeks earlier
- Increased profits

## Pears

Donnybrook West Australia



Pears treated with AgriLife and normal fertilizer yielded 9 ton more pears per hectare (2.45 acres) than the best crop in the previous 20 years of keeping records.

## Other Crops

Many different crops have benefited from AgriLife protection strategies

Corn & Hay



Turf



We offer support to our customers in the development of new cost-effective programs to improve yields and maximize longevity for the harvested crops.

Soy Bean



Ornamental



Wheat





## Hay Trial



	Crude Protein	Digestible Protein	ADF <sup>1</sup>	TDN <sup>2</sup>	Phosphorous	Potassium	Calcium
General Fertiliser	20.7	13.5	33.1	63	.29	1.71	1.38
AgriLife Plus Fertilizer	23	14.9	31.1	65	.32	1.86	1.36
Percentage change	+11	+11	-6	+3	+10	+9	-1

### NOTE:

- ADF1 - Acid detergent fibre, the lower the figure the more beneficial for animals.
- TDN2 - Total digestible Nutrients

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## Soybean Trial



### Check Plot 1:

10 litres / hectare general fertilizer applied 3 times in June, July and August.

### Check Plot 2:

10 litres / hectare general fertilizer plus 135 mls / hectare AgriLife in June application

### Conclusion

One treatment of AgriLife early in the season increased production by 11% (12.5 bushels / ha.)

## Winter Wheat Trial



### Check Plot 1:

30 litres / hectare general fertilizer.

### Check Plot 2:

30 litres / hectare general fertilizer plus 135 mls / hectare AgriLife in June application

### Conclusion

One treatment of AgriLife early in the season increased production by 24% (33.75 bushels / ha.)

## Golf Course Turf Trials



Trials were carried out to evaluate AgriLife effect on high stress turf areas. An increase in vigour and disease resistance was observed with AgriLife behaving as a nutrient synergist.

Fine Calcium Carbonate powder was applied as a spray with the AgriLife. A follow up plot was laid to further evaluate the calcium uptake (see below).

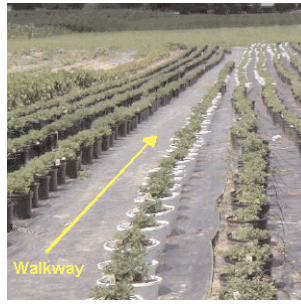
	Crude Protein	ADF	Calcium	Phosphorous	Magnesium	Potassium
General Fertilizer	20.8	34.8	3.1	0.47	0.57	1.62
AgriLife Plus Fertilizer	27.3	25.9	6.46	0.70	3.23	2.00
Percentage change	+31	-25	+108	+49	+467	+23

Samples were taken five days after spraying. Above results are from re-growth of sprayed green turf

	Calcium	Magnesium
General Fertilizer + Calcium	4.79	2.05
General Fertilizer	10.95	6.32
Percentage change	+129	+208

**Golf Course Turf Trials Are Presently being conducted in New York State by Cornell Cooperative Extension**

## Ornamentals Trial



Plants to the left-hand side of the walkway were treated with fertilizer and AgriLife. Plants to the right-hand side of the walkway were only treated with general fertilizer. Close up of samples from above. The untreated plant is showing signs of fungus whilst the AgriLife treated plant is healthier and much more robust.

Seedlings (right) were transplanted using AgriLife at a dilution of 0.1%.



## Tomatoes



The planted seedling (left) shows good root extension despite temperatures in high 30's.

## Potatoes

### Results

The results showed that in terms of the instance of blight.

Untreated	17% incidence
AgriLife	3% incidence
Copper Oxychloride	2.5% incidence

Potatoes (0.5 acre site) were treated with a combination of AgriLife. The site was compared with untreated and conventional Copper Oxychloride treated sites (0.5 acre sites). The site was located in Scotland (Scottish Agricultural College - SAC).



### Yields

Percentage increase over untreated

AgriLife	21% increase
Copper Oxychloride	8.5% increase

### Application Rate

Timing	Rate per Hectare	
	AgriLife	Water (litres)
As transplant solution	10	100 - 200
10 - 14 days after transplant	135	400 - 1,000
7- 10 days thereafter until harvest	135 - 270	400 - 1,000

# MATERIAL SAFETY DATA SHEET

## STATEMENT OF HAZARDOUS NATURE

Non-hazardous

## IDENTIFICATION

PRODUCT NAME:	AGRILIFE concentrate
UN NUMBER:	Not Relevant
DANGEROUS GOODS CLASS:	Not Relevant
HAZCHEM CODE:	Not Relevant
POISONS SCHEDULE NUMBER:	Not Relevant

## USE

AGRILIFE is a nutrient synergist which enhances the immune response of the plant at times of stress.

## PHYSICAL DESCRIPTION/PROPERTIES

APPEARANCE:	Amber liquid.
ODOUR:	Coconut.
FLASHPOINT(°C):	Non-flammable.
SPECIFIC GRAVITY (200 °C):	1.10 - 1.15
FLAMMABILITY LIMITS(%):	Not relevant.
BOILING POINT:	100°c.
SOLUBILITY IN WATER(g/L):	Totally soluble.
SOLUBILITY (OTHER)	Infinite in alcohols and glycols.
pH @ 200 °C	3.0 – 3.5.

## INGREDIENTS

CHEMICAL ENTITY	CAS No.
AgriLife concentrate	94349-97-0
Octanoic Acid	124-07-2

## IDENTIFICATION

## HEALTH EFFECTS

SWALLOWED:	It may sterilize gut.
EYE:	May cause irritation to eyes.
SKIN:	Non hazardous.
INHALED:	Non hazardous.

## **FIRST AID**

SWALLOWED: Drink copious quantities of water. Seek medical advice.  
EYE: In case of contact with eyes, rinse immediately with plenty of water for at least 15 minutes.  
SKIN: This product is non hazardous.  
INHALED: Non hazardous.

ADVICE TO DOCTOR: Treat symptomatically.

## **PRECAUTIONS FOR USE**

**EXPOSURE STANDARDS** Non hazardous.

**ENGINEERING CONTROLS** Special ventilation is not required as this substance is non toxic and non hazardous.

## **PERSONAL PROTECTION**

CLOTHING: Not relevant.  
GLOVE TYPE: Not relevant.  
EYE PROTECTION: Wear protective goggles if appropriate.

## **SAFE HANDLING INFORMATION**

### **STORAGE AND TRANSPORT**

#### **STORAGE**

Store in dry, sealed containers. Keep away from children. Store above 0 °C.

#### **TRANSPORT**

Product is non-hazardous.  
Restrictions: None.

### **SPILLS AND DISPOSAL**

#### **SPILLS**

There are no special requirements. Product is non-toxic and is 100% biodegradable. Non hazardous if it enters waterways.

#### **LARGE SPILL**

There are no special requirements. Wash away with water.

#### **DISPOSAL**

Dispose of in accordance with local and state regulations.

### **FIRE/EXPLOSION HAZARD**

#### **HAZARD**

Hazchem Code: Not relevant

**SMALL FIRE**

~ Use dry chemical, CO<sub>2</sub> or water spray.

**LARGE FIRES**

~ Use dry chemical, CO<sub>2</sub>, foam or water spray.

<b>CONTACT POINT</b>
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