

Agroworld

Natural Biostimulant Innovations



BioFlavv™ - Flavonoids



Natural • Scalable • Proven Efficacy • Affordable • Sustainable

***Next Generation Innovative Biostimulants
for Sustainable Agriculture with Conventional and Organic Growers***



BEFORE: Hail Storm Nebraska early 2020



AFTER: AW Applications 40 days later

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 - *turf*
 - *AgroWorld/McGill trials*

End



Proven BioFlavv™ Bio-Stimulant Crop Benefits

Fruit

- Quality & yield
- Ripening, firmness, taste
- Nutrient & minerals
- Improved yield due to reduced stress.



Corn



Soybeans



Wheat

Plant

- Photosynthesis – turgor.
- Nutrient retrieval during senescence.
- Helps other agrochemicals into plant.
- Resistance to fungal decay.
- Biotic & abiotic stress reduction

Seed/Seedlings

- Germination,
- Early start, success rate



Chili



Tomatoes



Zucchini

Flowers

- More flowering, increased flower numbers,
- Attracts pollinators.

Roots & Nutrient Absorption

- Root Exudates.
- Rhizosphere activity (longer term
- root and soil effects)
- Adapt in soil with toxic metals



Grapes



Fruits



Turf

Soil

- Bio-mass, development, Soil quality
- Less compaction of soil.
- Increased free living organisms, soil quality

Source: AgroWorld Trials and Growers Results

UNIQUE: helps all other nutrients, minerals, fungicides applied from the farmers tank into into the plant more effectively

AgroWorld Experiences on Crops

Fruit & Vegetables

Tomatoes
 Strawberries,
 Blueberries
 Peppers,
 Watermelons,
 Pumpkins,
 Spinach,
 Cucumbers,
 Onions
 Olives
 Celery
 Potatoes
 Lettuce
 Zucchini
 Radishes
 Raspberries
 Cabbage
 Potatoes
 Carrots
 Asian vegetables

Field Crops

Soy beans
 Wheat
 Corn
 Hay
 Cotton (Au)
 Alfalfa
 Barley
 Sorghum

Nurseries/ Greenhouses

Honeysuckle
 Evergreens
 Azaleas
 Mums
 Lawn grass
 Greenhouses
 Consumer
 Tomatoes
 Cannabis
 Cucumbers
 Strawberries

Grapes

Wine Grapes
 Table Grapes

Fruit & Nut Trees

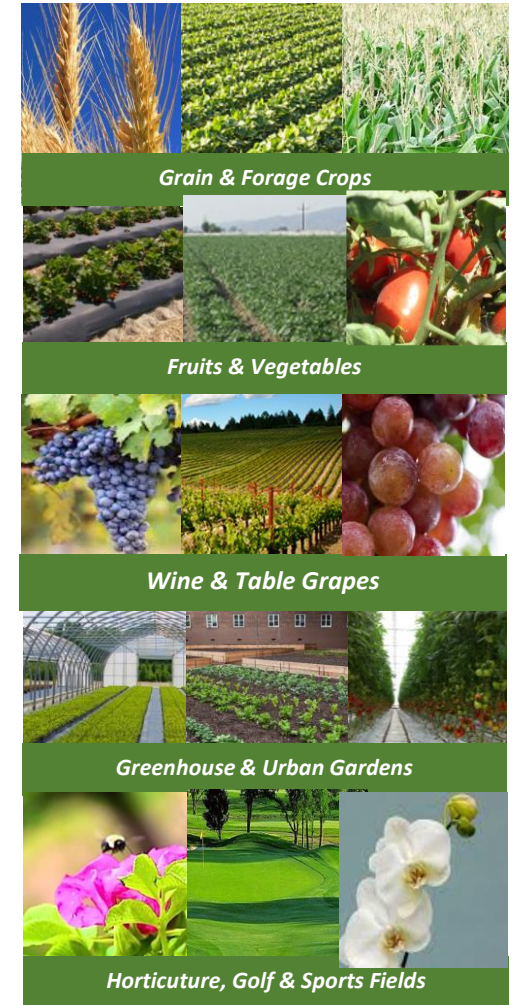
Almonds & macadamia
 Apples
 Pears
 Peaches
 Plums
 Cherries

GRASSES

Sugar cane
 Grasses

Other

Tea Trees
 Cannabis
 Coniferous

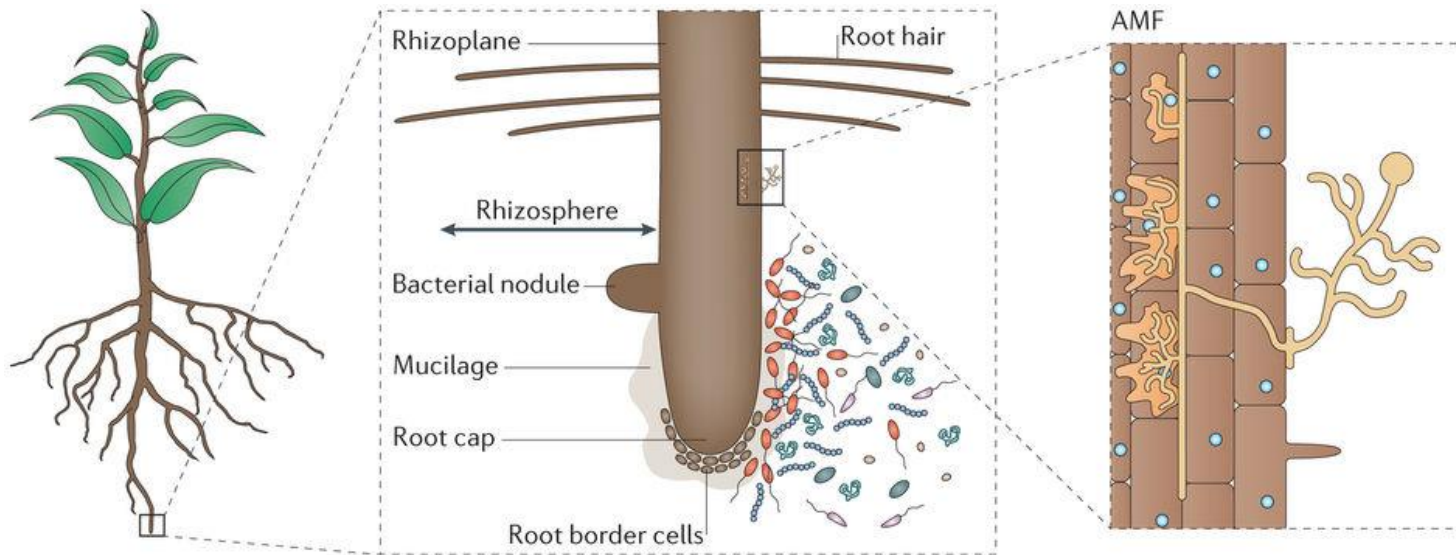


Results/Experiences/Regular Customers on these Crops

Plant Signaling

How Does it Work?

Plant Roots surrounded by billions of bacteria “talking” to the plant, each other, & other microorganisms in the soil for **CROP SURVIVAL**: Reduce stresses and improve plant and food health



Nature Reviews | Microbiology

Signaling Technology: AgroWorld & McGill “Center of expertise in Plant Signaling Technology”

REFERENCE: <https://www.frontiersin.org/research-topics/3163/signaling-in-the-phytomicrobiome>

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AgroWorld
Reclaiming our planet



Our AgroWorld Solutions

BioSignal™, BioTotal™

BioFlavv™ & BioFlavv FSC™

***Based on Signaling Research with
McGill Agriculture center of Excellence***

BioSignal™

Naturally occurring beneficial microbes (cell free).

BioTotal™

Plant Metabolites & microbes (cell free)

BioFlavv™

Plant extract flavonoids

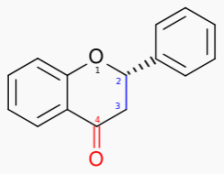


Benefits:

- Reduces climate change impact
- Boost immune system
- Improving crop yield & soil quality
- Uptake of nutrients and minerals,
- Reducing biotic and abiotic stresses
- Totally natural (organic)
- Reduced input cost
- Reduced growers mental stress

NOTE: Previous generation, McGill biostimulant research outcomes have produced products successfully applied on 250 million acres and another valued at \$100M+

BioFlavv™ Flavonoids (Basics)



INTRODUCTION TO FLAVONOIDS

- Plant secondary metabolites, discovered in early 1930s
- Every University with an “Ag” college studies Bio-Flavonoids – so powerful
- Flavonoids are phytonutrients that fall into the chemical category of polyphenols
- 6,000 unique flavonoids have been identified. The largest and best studied are:
- Flavonoid family: Quercetins, anthocyanins, Resveratrol, tannins are flavonoids (wine and table grapes), flavanols, flavones, flavonones
- *Flavonoids* are polyphenolic compounds that are ubiquitous in nature and are categorized, according to chemical structure, into flavanols, flavones, flavanones, isoflavones, catechins, anthocyanidins and chalcones.

FUNCTION OF FLAVONOIDS

- Protect plants from different biotic and abiotic stresses (climate change – weather) and
- Act as unique UV-filter, function as signal molecules, allelopathic compounds, phytoalexins, detoxifying agents, antimicrobial defensive compounds. Flavonoids have roles against frost hardiness, drought resistance and may play a functional role in plant heat acclimation and freezing tolerance.



Review

Flavonoids in Agriculture: Chemistry and Roles in, Biotic and Abiotic Stress Responses, and Microbial Associations

Ateeq Shah and Donald L. Smith *

Lead Professor at McGill

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* Correspondence: donald.smith@mcgill.ca

Received: 26 June 2020; Accepted: 11 August 2020; Published: 17 August 2020



Abstract: The current world of climate change, global warming and a constantly changing environment have made life very stressful for living entities, which has driven the evolution of biochemical processes to cope with stressed environmental and ecological conditions. As climate change conditions continue to develop, we anticipate more frequent occurrences of abiotic stresses such as drought, high temperature and salinity. Living plants, which have evolved various mechanisms to cope with these extremes. However, the current world of climate change, global warming and a constantly changing environment have made life very stressful for living entities, which has driven the evolution of biochemical processes to cope with stressed environmental and ecological conditions. As climate change conditions continue to develop, we anticipate more frequent occurrences of abiotic stresses such as drought, high temperature and salinity. Living plants, which have evolved various mechanisms to cope with these extremes. However, the current world of climate change, global warming and a constantly changing environment have made life very stressful for living entities, which has driven the evolution of biochemical processes to cope with stressed environmental and ecological conditions. As climate change conditions continue to develop, we anticipate more frequent occurrences of abiotic stresses such as drought, high temperature and salinity. Living plants, which have evolved various mechanisms to cope with these extremes.

R&D Flavonoids McGill Research

- Technologies on 250 million acres
- Focus sustainability of the planet food supply
- Reduction in extreme weather stresses

Tech Papers available



McGill Farm



Dr Smith, Selva,
Congo Project Mgr.



Corn, wheat, soybeans
Canola, L93, tomatoes

Example of: What do flavonoids do?

Consistent Ripening



UV & Heat Stress Protection



Canopy Health



Soil Biology



Untreated

With BioFlavv

***Wine Grapes
& Vineyards***

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BioFlavv™ *Effects on Roots & Soil*



What does BioFlavv do? Roots & Soil

- BioFlavv helps the plant to produce its own range of secondary metabolites (flavonoids).
- BioFlavv activates the “Calcone synthase” –which is called backbone of flavonoid production
- Creates:
 - Increased photosynthesis
 - Increased root exudates
 - Healthier and more efficient root systems
 - Activates the natural defense mechanisms
 - Balance the plants hormone levels
 - Improves soil biology



Untreated



Treated w/ BioFlavv

Effects of BioFlavv on Soil

Soil Biology Test

The control has most of the bacterial and fungal populations in a dormant form which is not providing nutrients to the vines.

The soil impact in the control was harder than in the trial activity resulting in a better sample after 2 years.

The flavonoid product BioFlavv has encouraged microbial structure in the trial sample.

SOIL BIOLOGY TEST:

“The fungal component is very good in this sample. When comparing the control and trial it is apparent that the total pools have been activated by the product.

Although the soil moistures between the trial and control are not statistically different, there is a visual difference in the texture - the trial is much less compacted into clumps than is the control soil which is rock hard. The increased activity of both bacteria and fungi in the active pool will be providing glues that are reconstructing the soil in the trial block. “

Control



Trial



Application - Roots & Soil

Benefits of seed treatment on Soybeans (below comments refer to above image):

- Flavonoids play a crucial role during nodulation after the rhizobia have entered the roots.
- The two roles for flavonoids are to inhibit auxin transport at the site of rhizobial infection -
 - (a) To induce rhizobial Nod signal biosynthesis
 - (b) Flavonoid-depleted roots have significantly reduced nodulation.
- Flavonoid-depleted roots of soybean are also deficient in both auxin transport inhibition and nodulation.
- Nodulation in isoflavone-deficient soybean roots can be restored by using C4L.
- May increase yields from 10% up to 30% as the soil will be balanced with beneficial microbes.



Untreated



Treated BioFlavv

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BioFlavv™ *Effects on Field, Forage & Grain Crops*



BioFlavv™ on Corn

Summer 2020 USA



**PHOTO #1: Hail Storm Results July 2020 US Midwest
(Actual Photo of the affected farm)**

AgroWorld's BioFlavv™ hail storm relief "and"

- Yield & protein increase
- Other inputs nutrients and minerals get into the plant more effectively
- Plant health
- Good nutrients help with organic pests
- Germination
- Soil health



**PHOTO#2: Two Applications of BioFlavv™
and the crop returned to full healthy growth
(actual photo of the crop)**

**Full Crop Recovery From
Hail Due to BioFlavv**

BioFlavv™ on Corn



Actual Photos NY



Strong & Healthy
Stalk & Brace Roots



2 cobs per stock



Stalk health -right
into soil

Challenged Corn Crop in Early Season:

- Natural minerals, fertilizer & **BioFlavv™** applied
- Note the root health, two cobs/stock
- Absence of disease pressure & senescence at the base

“Healthiest corn crop in this field – ever”

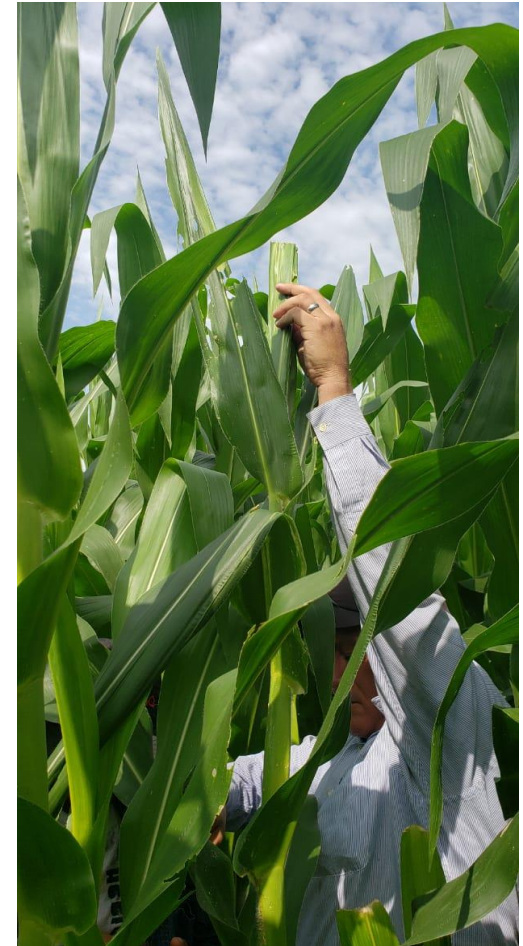
Trials of Foliar BioSignall™ on Corn/Maize

(metric units) Ecuador, S.A,

Parameter	Avg. Cob Length cm	Avg. Cob Diameter cm	Avg. # Kernels /Cob	Avg. Weight /cob gms.	Avg. Weight /1000 kernels gms.
Control	15.89	5.30	464.70	226.61	367.15
BioSignall	18.66	6.22	485.75	269.19	418.90
RESULT	17.4%	17.3%	5%	18.9%	14%

TABLE #1: Average over 60 blocks x 3 applications x 3 different dosages. (60 cc/300 m²)

19% increase in weight



Results will vary depending upon individual use, please review AW disclaimer

BioFlavv on Paddy Rice USA

AgroWorld BioFlavv™ as a tank-mix partner with post emergent herbicides on Rice.



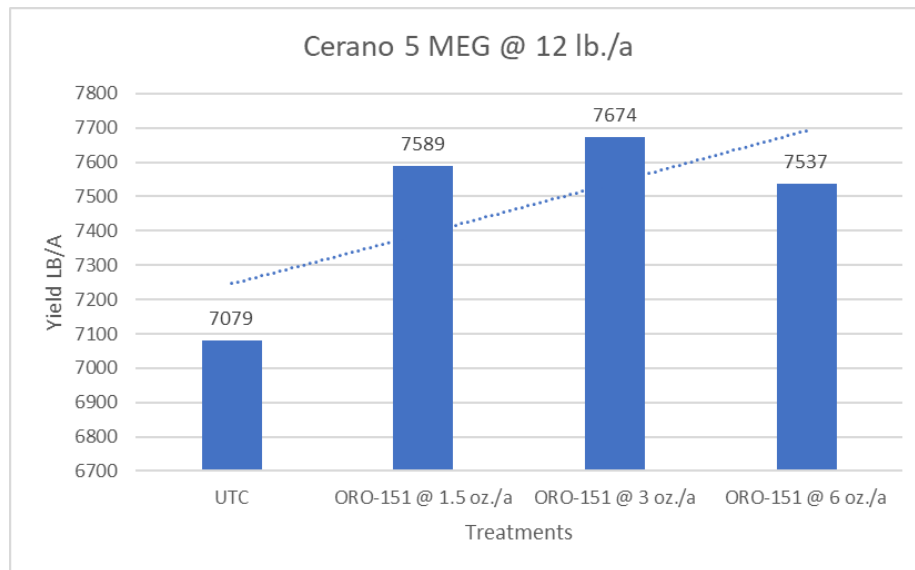
Problem :

Rice becomes bleached and stunted when certain essential post emergent herbicides are used in a crop production program. The objective for this study was to see if we could use BioFlavv™ as a “safener” when used as a tank-mix partner with post emergent herbicides on paddy rice.

BioFlavv™ Treatment on Paddy Rice California

Rice was sprayed with the post emergent herbicide Cerano 5 MEG @ 12 lb./a
BioFlavv was added as a tank mix partner at 1.5 , 3 and 6 fluid ounces per acre respectively

Treatment name	Yield LB/A	Treatment cost \$	Produce value per acre	\$ Value difference vs the UTC	ROI	
UTC	7079		\$ 1,447.30			
BioFlavv @ 1.5 fl. oz/a	7589	\$ 1.99	\$ 1,553.90	\$ 106.60	\$ 102.61	\$ 25.72
BioFlavv @ 3 fl. oz/a	7674	\$ 1.98	\$ 1,570.30	\$ 123.00	\$ 115.02	\$ 14.41
BioFlavv @ 6 fl. oz/a	7537	\$ 5.97	\$ 1,541.60	\$ 4.30	\$ 78.33	\$ 1.90



Commercial rice price @ \$410/mt
BioFlavv price calculated @ \$90 / liter or \$33.81 / fl. oz...

A paddy field is a flooded [parcel](#) of [arable land](#) used for growing [semiaquatic](#) crops, most notably [rice](#) and [taro](#).

Source: https://en.wikipedia.org/wiki/Paddy_field



BioFlavv™ Treatment on Paddy Rice California

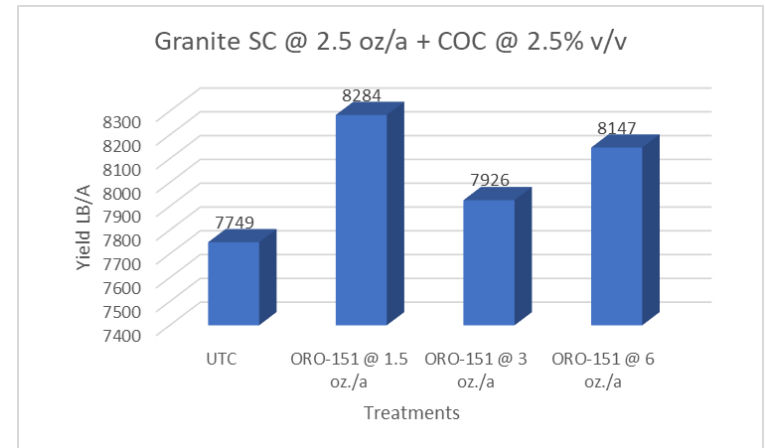
Rice was sprayed with the post emergent herbicide
Granite SC @ 2.5 oz./a + COC @ 2.5% v/v
BioFlavv was added as a tank mix partner at 1.5 , 3 and 6 fluid ounces per
acre respectively

Treatment Name	Yield Lb/acre	Treatment Cost	Produce Value/Acre	\$ Value Difference	ROI	ROI Difference
UTC	7749		\$1,586			
BioFlavv @ 1.5 fl. ounces/acre	8284	US\$3.99	US\$1,697	US\$110	US\$106	US\$26
BioFlavv @ 3.0 fl. ounces/acre	7926	US\$7.98	US\$1,623	USD\$36	US\$29	US\$3
BioFlavv @ 6 fl. Gl. ounces/acre	8147	US\$15.97	US\$1,668	US\$82	US\$66	US\$4
Commercial Rice Price # US\$410/mt						
BioFlavv price calculated at US\$90/liter or \$33.81/ounce						



Oryza sativa, commonly known as Asian rice

**Improved Plant Health &
Reducing Herbicide Stress**



BioFlavv™ Treatment on Paddy Rice

California

Improve plant health while mitigating clomazone injury

Replication I



Control (clomazone alone)



12 fl. oz rate + clomazone



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BioFlavv™ *Effects on Wine & Table Grapes*

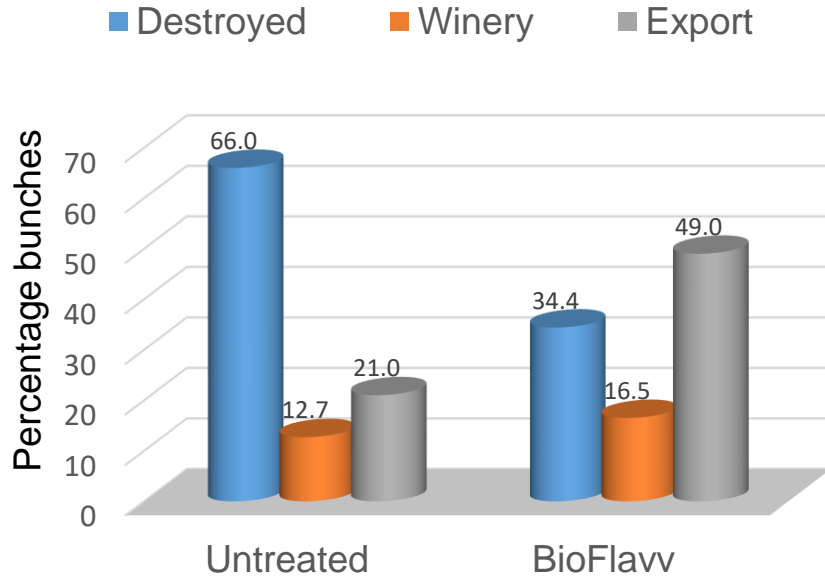


California Table Grapes

BioFlavv on heat stress:

(Redglobe, Nuli Secundes, De Doorns, 2012)

Heat wave: 23-24 December 2012



BioFlavv spray programme:

11-Oct-12	15-30 shoot length	400ml/ha
14-Nov-12	Flowering to Cap fall	500ml/ha
04-Dec-12	Pea to small marble	500ml/ha

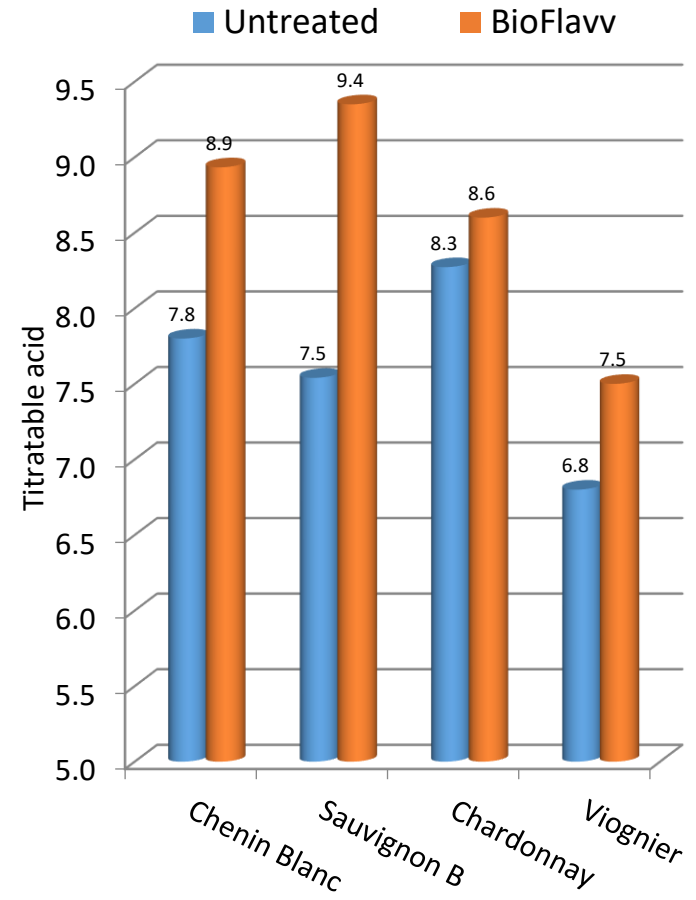
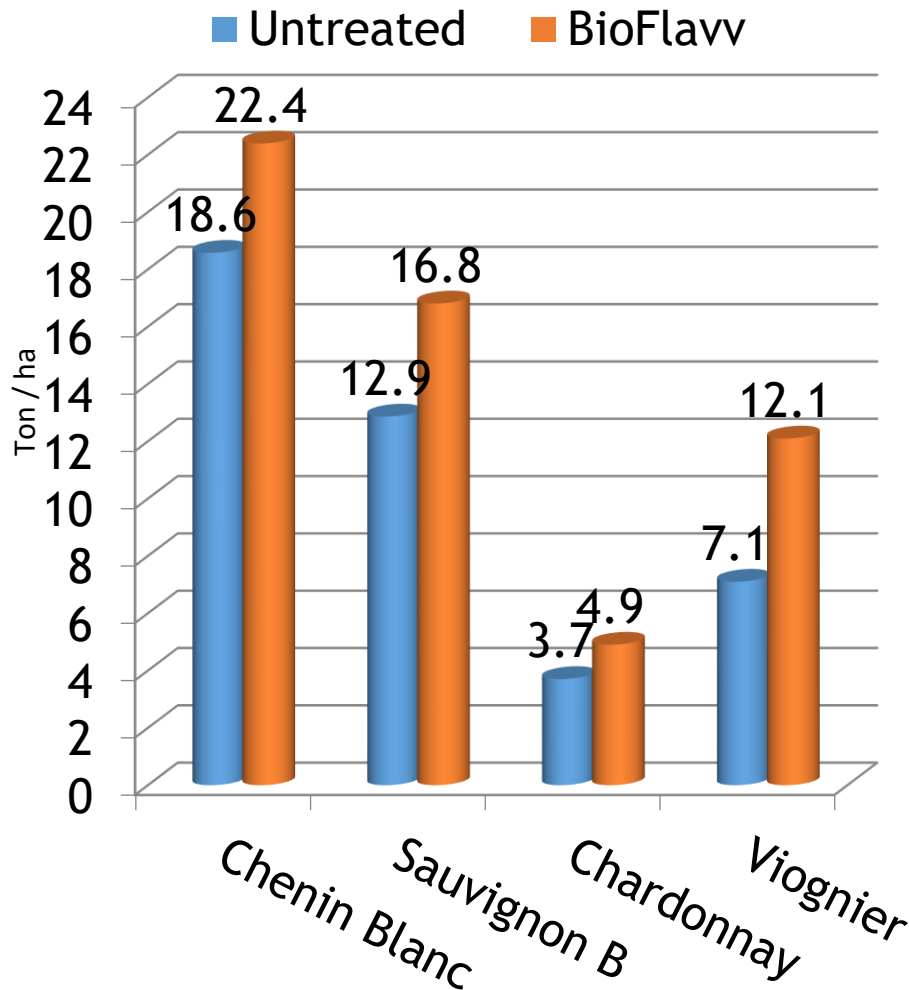
Untreated



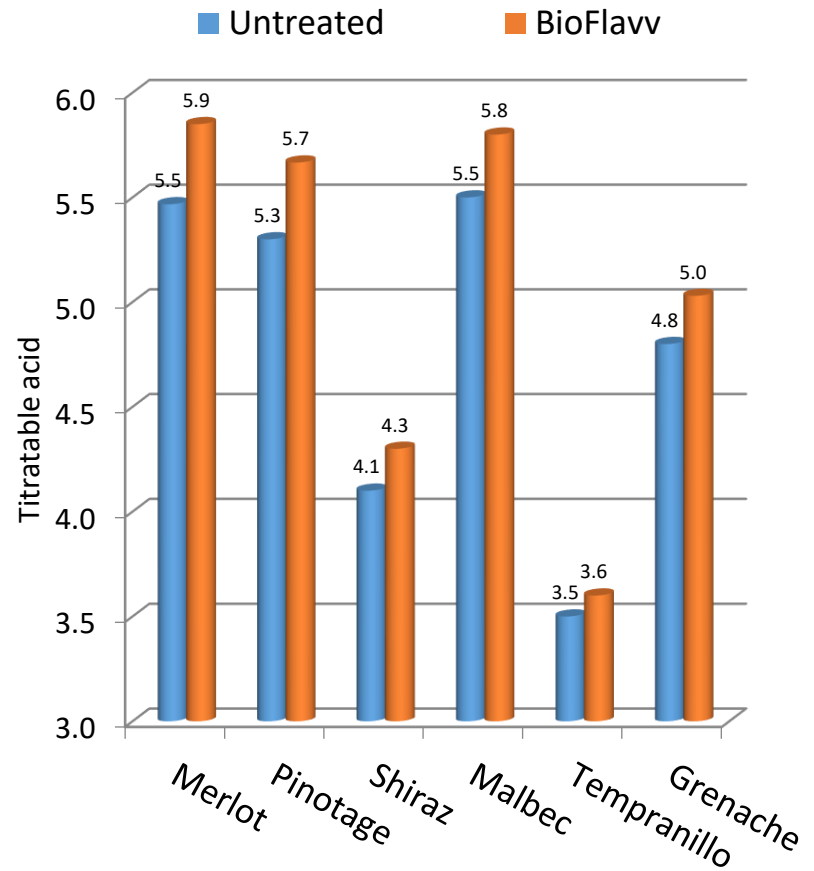
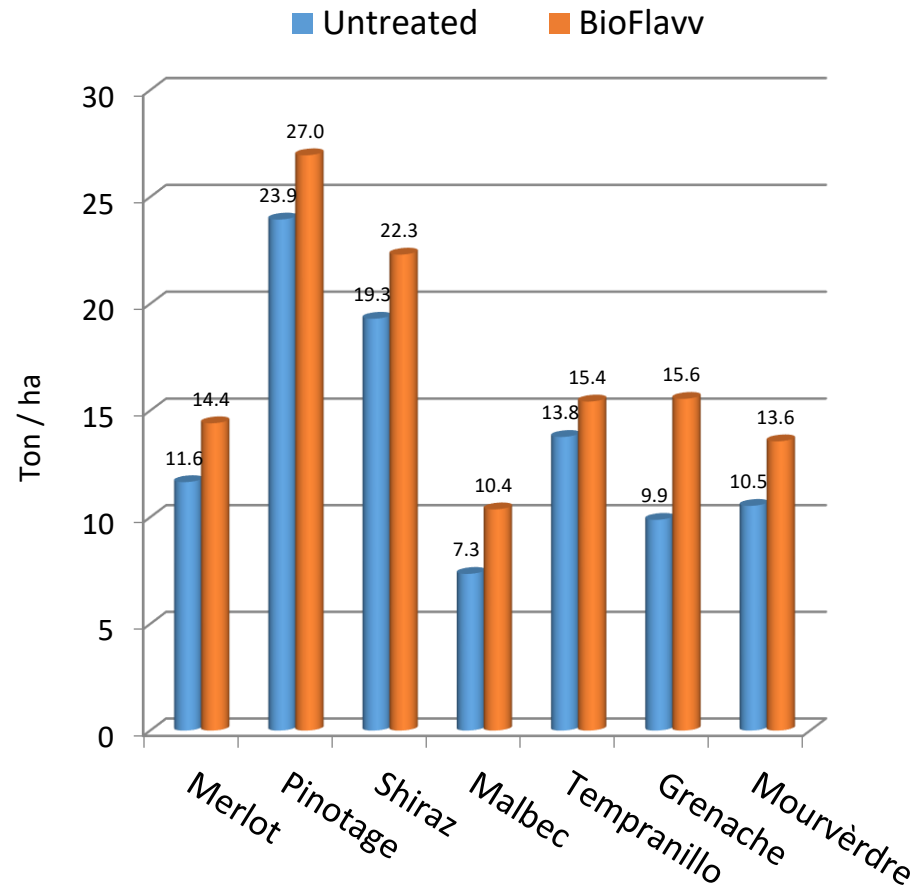
BioFlavv



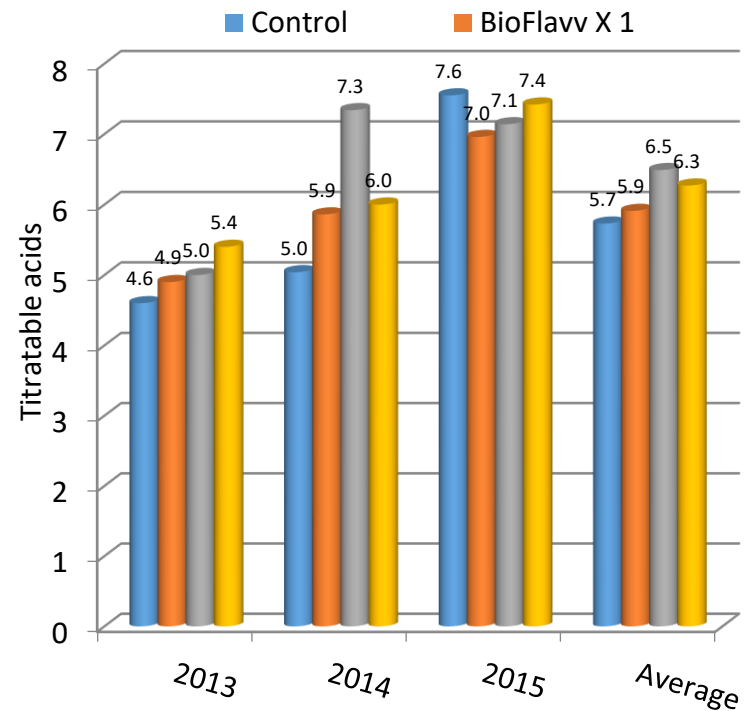
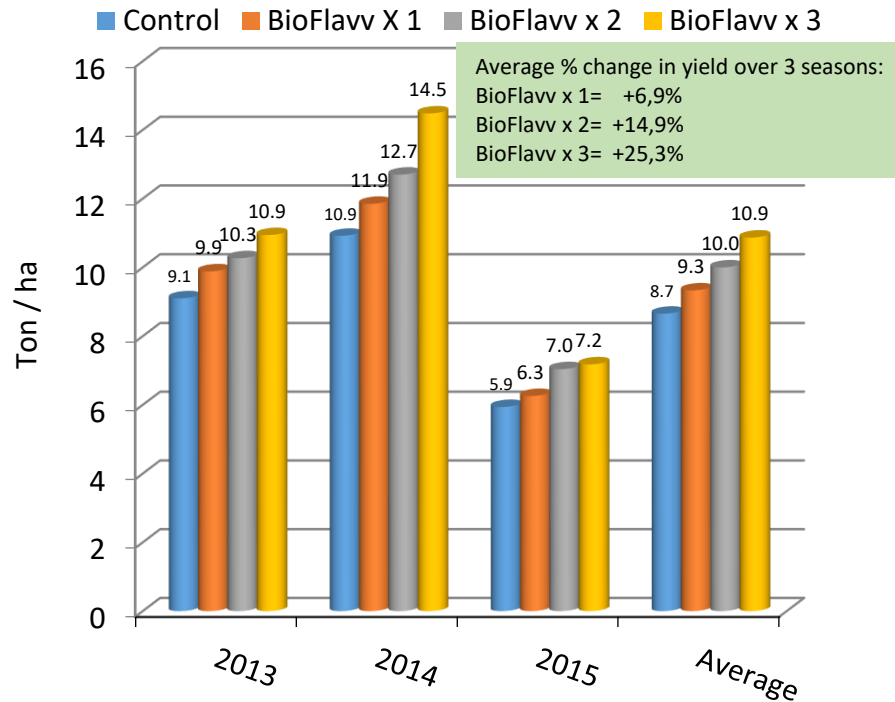
BioFlavv on yield & titratable acidity for various white grape cultivars



BioFlavv on Yield & Titratable acidity for various red grape cultivars

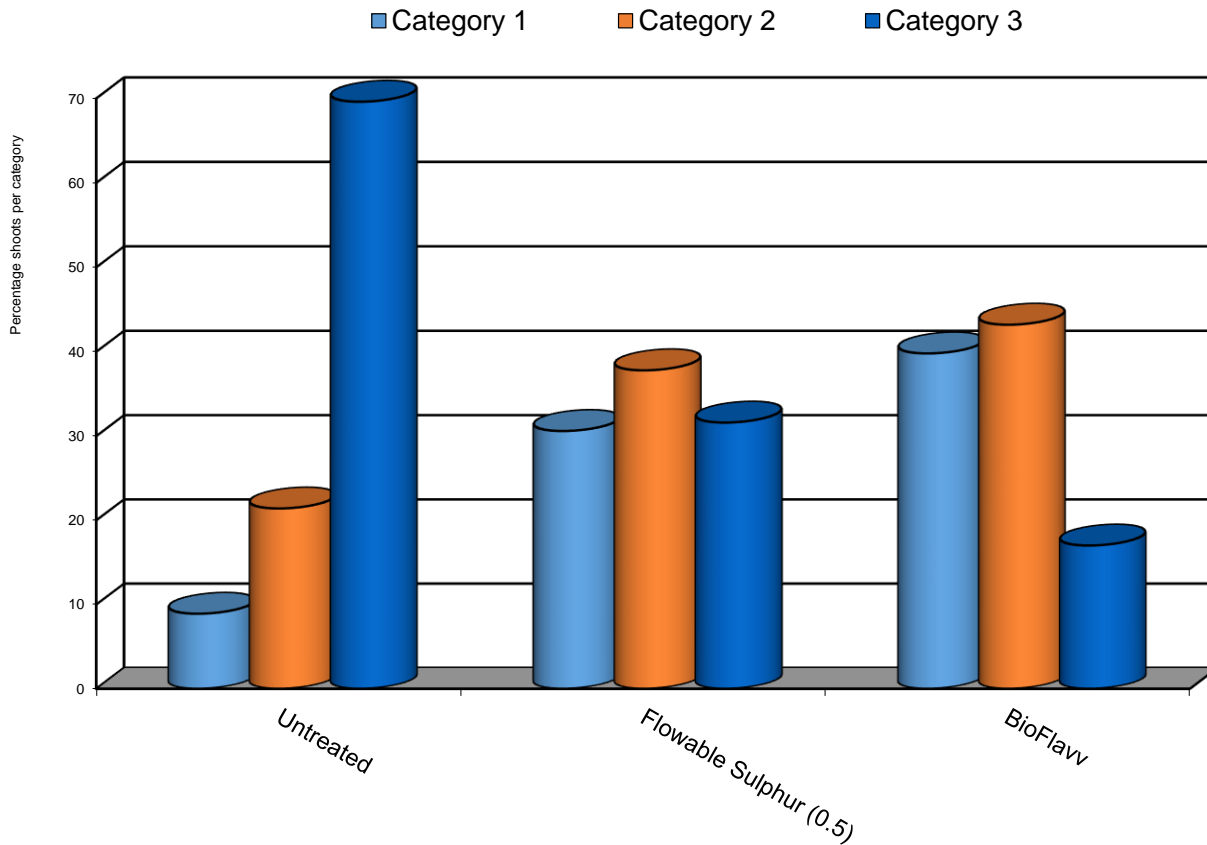


Effect of BioFlavv applications over 3 seasons on yield and percentage tartaric acid. Cabernet sauvignon (J. Basson, Malmesbury)



BioFlavv X 1 @ Pre Flower (mid October) (300 ml / ha)
 BioFlavv 2 @ Cap fall/set (mid November) (300ml / ha)
 BioFlavv x 3 @ Pea sized berries (mid December) (400ml / ha)

BioFlavv on Erinose mite infestations on new growth at harvest Chenin Blanc: Slanghoek



Category 1



Category 2



Category 3

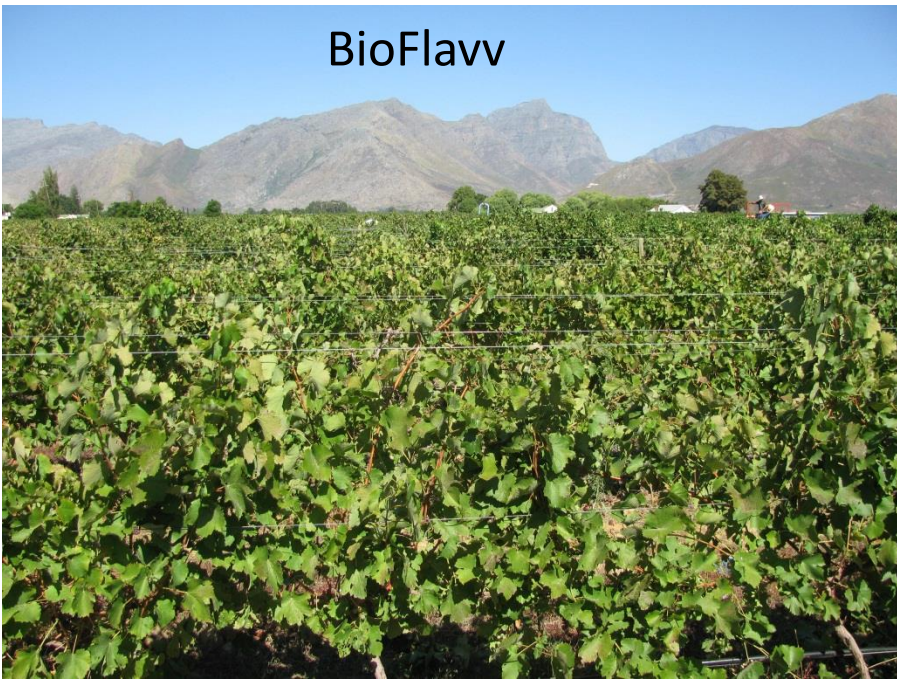


Untreated



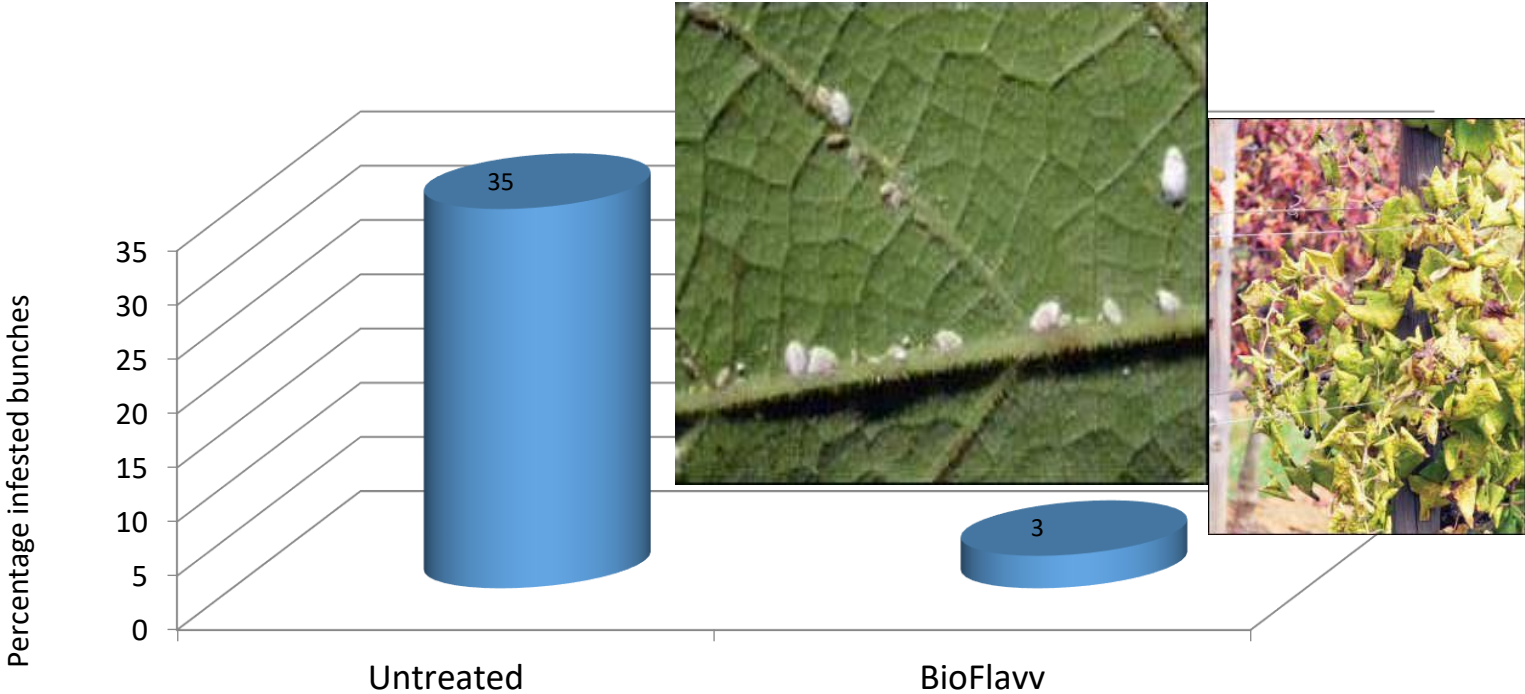
Peet Smith, Rawsonville

BioFlavv



Groot Constantia: Merlot

Percentage bunches infested with mealy bug at harvest



Observations: 35-50 % less loose berries in the container after assessments
BioFlavv less snout beetle damage on berry stems

Cabernet Sauvignon - Malmesbury



Untreated

1. BioFlavv X 1 @ Beginning flowering (begin November 12)
2. BioFlavv X 2 @ 1 plus a month later (beginning December 12)
3. BioFlavv X 3 @ 1 + 2 + a month later (beginning of January 13)

Percentage Powdery M infected bunches

78.0

45.2

4.8

0.8

Shiraz- Boschendal

BioFlavv: 11%



bunches

Snout beetle damage

Untreated: 51%



Untreated



Treated



Grapes with Glyphosate damage

Treated



Treated



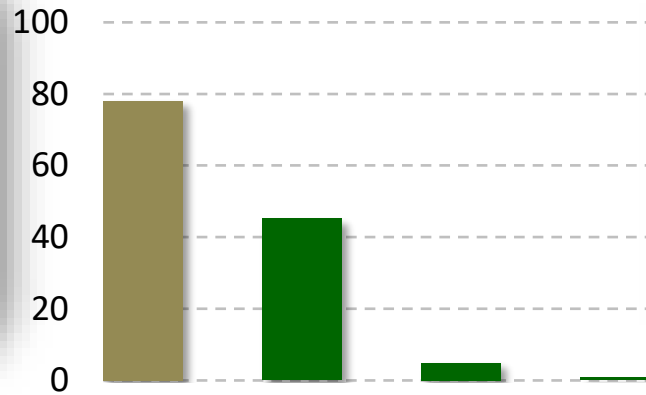
Powdery mildew infection and bunch quality

Cabernet Sauvignon, Malmesbury

Untreated



% Infected Bunches at harvest



BioFlavv



Begin flower (Oct)	--	BioFlavv	BioFlavv	BioFlavv
One month later (Nov)	--	--	BioFlavv	BioFlavv
One month later (Dec)	--	--	--	BioFlavv

Effect on Heat stress and bunch quality

Red Globe, De Doorns, 2012

BioFlavv spray program:

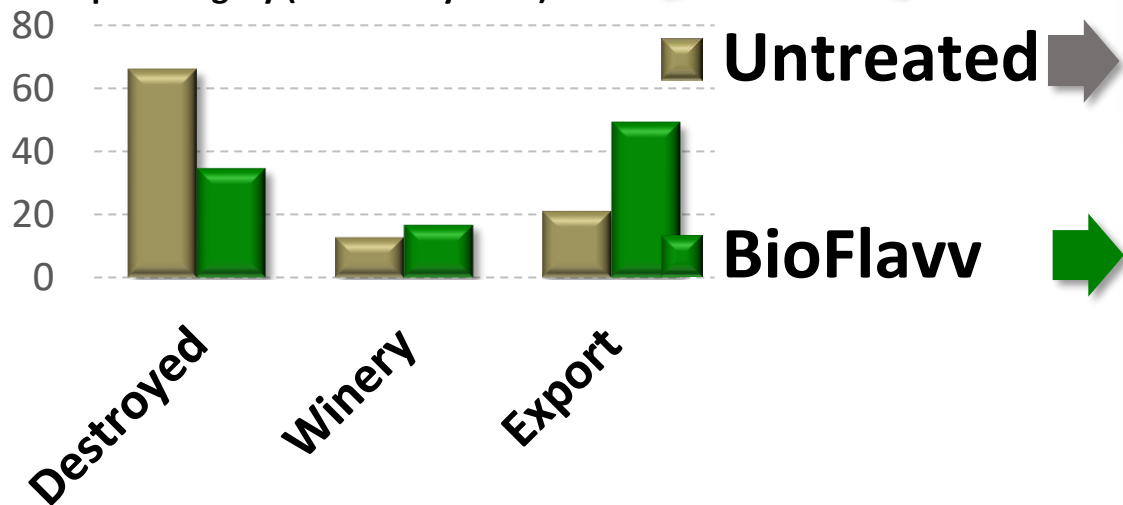
11 Oct '12 - 15-30 shoot length 400ml/ha

14 Nov '12 - Flowering to Cap fall 500ml/ha

04 Dec '12 - 5-10 mm berry size 500ml/ha

23-24 December 2012
Heat wave!

% Bunches per category (18 January 2013)



BioFlavv over 2 seasons

Soil Analyses - block 1A, Plasir De Merle

Sheila Storey M Sc (Agric) Pr Sci Nat

www.nemlab.co.za



6-year old Cabernet Sauvignon on Richter 99

Email / Epos: sheila@nemlab.co.za Tel: 021 875 8160 Fax / Faks: 086 520 5815

Index	Untreated		BioFlavv (2 year program)	
	Value	Comment	Value	Comment
Structure (SI) <i>Strukturindeks</i>	19,14	Few trophic compounds (0% = none)	36,89	Structure improved
Enrichment index (EI) <i>Verrykingsindeks</i>	87,85	Highly N-rich, but not broken down	46,73	Sufficiently enriched
Channel index (CI) <i>Kanaalindeks</i>	4,27	Breakdown is bacterial	20,00	Breakdown is bacterial
Basal index (BI) <i>Basaalindeks</i>	11,81	Bacterial with enough resources and fast nutrient turnover	40,62	Many opportunists adapted to stress conditions
Fungal: Bacterial index (FBI) <i>Swam: bakterie indeks</i>	0,13	Fast decomposition and nutrient turnover	0,19	Fast decomposition and nutrient turnover

BioFlav on Wine Grapes

Fermentation study

Chenin Blanc. Harvest Jan 2013 @ sugar content 25°B

Screeners

Development CC.

2000/004049/23

T. L. Klerck - Independent Contractor

PO Box 1102

Wellington, 7654, RSA

Cell + 27 82 7734704

E-mail: screeners@worldonline.co.za

VAT. Reg. Nr. 4700195805

- ❖ Both Juice and wine acidity “*noticeably higher*” than untreated
- ❖ pH similar to untreated
- ❖ Fermentation was not affected





Natural Biostimulant Innovations

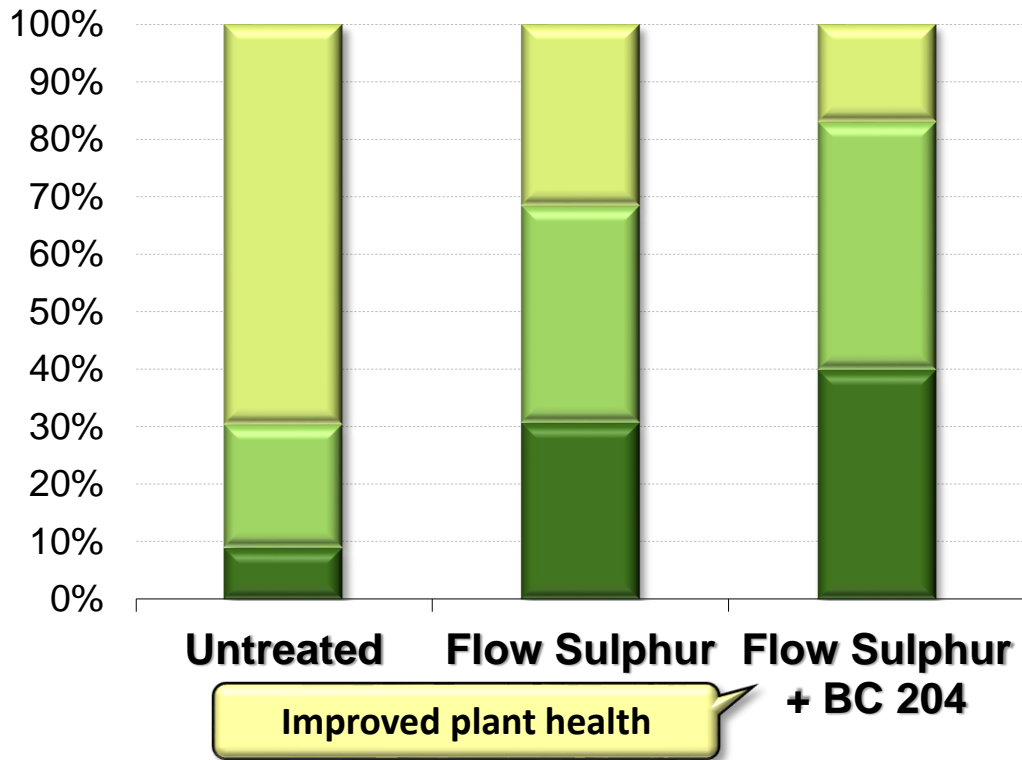


BioFlavv™ Effects on Wine & Table Grapes & Insect & disease suppression



Erinose mite infestations at harvest

Chenin Blanc. Rawsonville



Heavy infestation



Medium infestation



Light infestation



Erinose mite infestations and bunch quality at harvest

Peet Smith, Rawsonville

Untreated

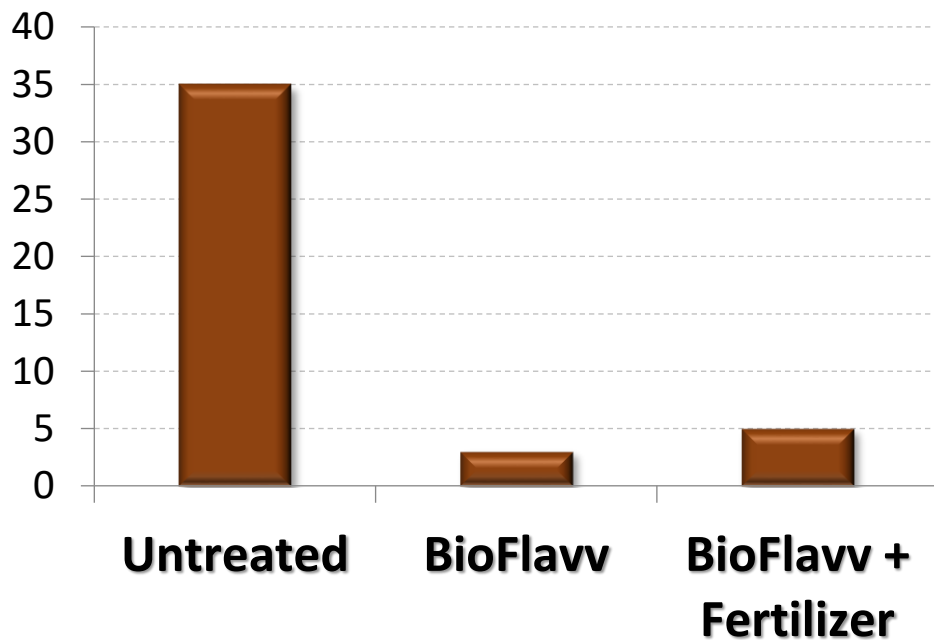


BioFlavv



Mealybug infestation at harvest

Percentage infested bunches, Merlot, Groot Constantia



Observations:

- ☪ 35-50 % less loose berries during assessments
- ☪ Less snout beetle damage on berry stems

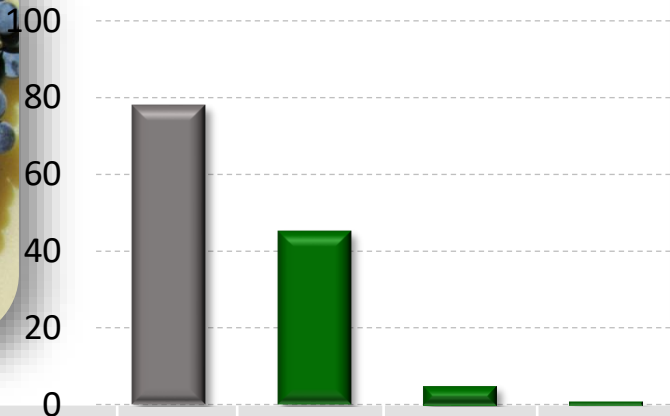
Powdery mildew infection and bunch quality

Cabernet Sauvignon, Malmesbury

Untreated



% Infected Bunches at harvest



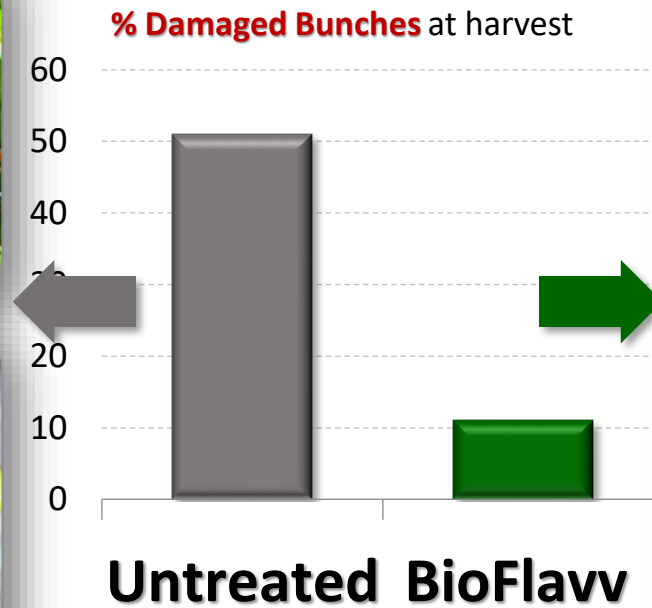
BioFlavv



Begin flower (Oct)	--	BioFlavv	BioFlavv	BioFlavv
One month later (Nov)	--	--	BioFlavv	BioFlavv
One month later (Dec)	--	--	--	BioFlavv

Snout beetle damage on bunch stems

Shiraz, Boschendal, Paarl



Esca



Esca, a wood disease affecting grapes all over the world, is one of the biggest modern threats to grape production. Esca is a complex disease involving several different fungi. It attacks the main vine of the plant and can destroy it within a few days; there is no questioning the unstoppable pace at which this disease progresses.

Esca is one of the oldest-known diseases to afflict grape vines, having been noted by the Greeks and Romans and damaging vineyards quite heavily in the early 1900s. In twentieth-century France, more than 5% of vines were killed by esca each year. Because the disease grows at a slow but progressive pace, even the larger, well-established vineyards could be totally destroyed by esca in 15 to 20 years.

Esca Results & Discussion

In table 1 are presented the results after two seasons applications. As shown, even from the first year of application there was an important decrease of esca incidence while there was a significant decrease of sudden death of plants. The year before application of BioFlavv the situation was dramatic and the farmer wanted to replace the vineyard.

Table 1. Effect of BioFlavv on Esca in Agiorgitiko Vineyards

Season	Chronic Symptoms	Acute Symptoms (apoplexy)
2005 (Before BioFlavv)	≈ 50	10
2006	≈ 20	1
2007	≈ 10	0



Figure 1. Vineyard in 2006



Figure 2. Vineyard in 2007



Figure 3. Vineyard in 2008



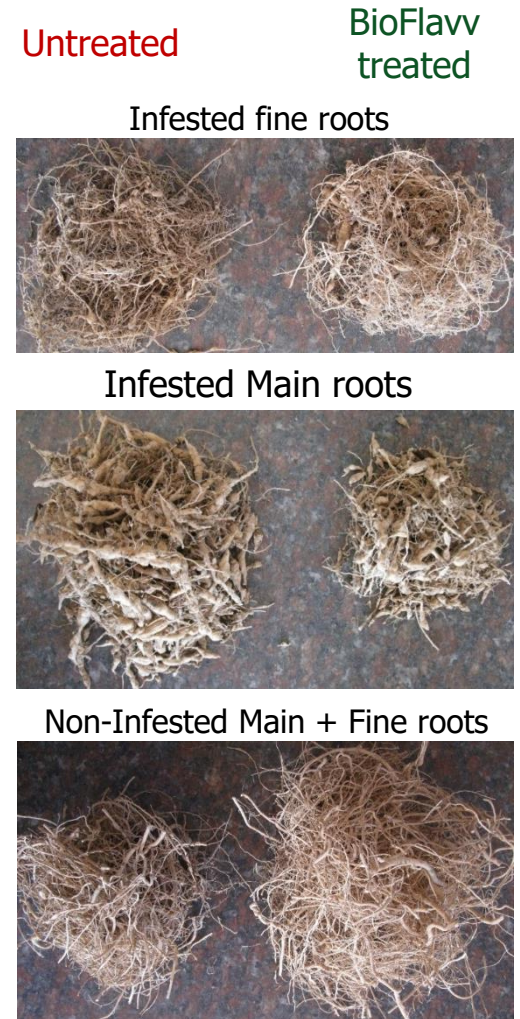
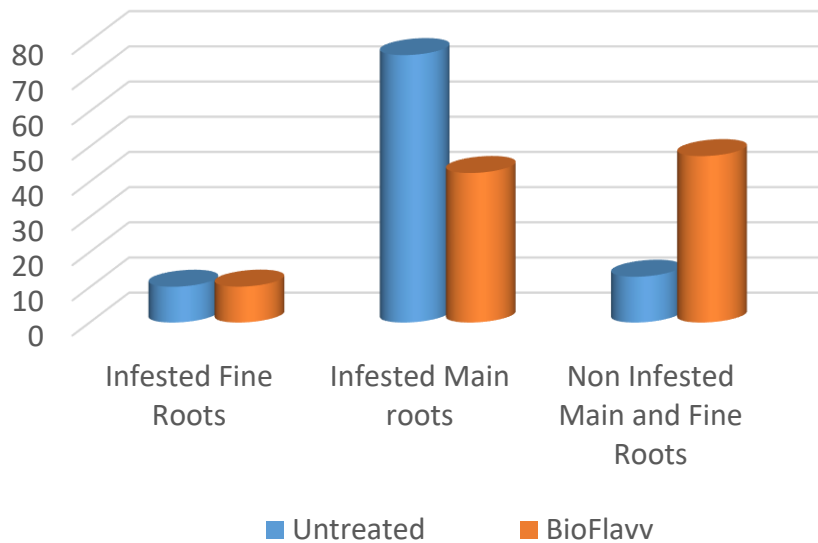
Natural Biostimulant Innovations



BioFlavv™ Effects on Fruits & Vegetables

Results on Tomatoes

Percentage Roots per mass infested with root knot nematodes



Application - Onions

General plant benefits

- Enhanced Photosynthesis and increased secondary metabolite levels enable the plant to improve production of carbohydrates.
- Increased root exudates, stimulate activity of beneficial rhizosphere organisms and improves colonization of soil fungi on roots, while suppressing harmful organisms.
- Healthier rhizosphere ensures more effective uptake of nutrients and water.
- Treated plants are healthier, more resistant to pest and disease attacks and able to perform better under sub-optimal conditions.
- 15-20% more plants per acre with more uniform bulb size (up to 75% medium)
- Improves uptake of nutrients.
- Well suited to integrate with biological soil inoculates.
- Suitable for use in organic production.
- Increased profitability.
- Improved quality - less fussarium, etc.
- Defends: Inhibit phytopathogenic attacks such as fussarium, phytophthora verticillium and induce plant-defense mechanism against potential pathogenic attacks.
- May increase yield 10-30%.

Untreated



Treated



Untreated



Treated BioFlavv

Application - Leafy Greens

Benefits on Leafy Greens / Spinach:

- Enhanced Photosynthesis and increased secondary metabolite levels enable the plant to improve production of carbohydrates.
- Increased Biomass and chlorophyll up to 50%
- Increased root exudates, stimulate activity of beneficial rhizosphere organisms and improves colonization of soil fungi on roots, while suppressing harmful organisms. Induce-plant defense mechanism against potential pathogenic attacks.
- Healthier rhizosphere ensures more effective uptake of nutrients and water.
- Treated plants are healthier, more resistant to pest and disease attacks and able to perform better under sub-optimal conditions.
- Helps restore soil biology by converting fertilizer efficiency, enhanced micronutrient uptake, increase water retention, and yielding higher crop & quality.
- May increase yields from 10% up to 30%.



Leafy Greens/ Spinach	Program with C4L:	Remarks
	<p>Seedling trays: 2 fl. oz. per 25 gal soil drench solution.</p> <p>After Transplanting:</p> <ul style="list-style-type: none"> • 2 fl. oz. per acre • 2-3 more applications at 4 fl. oz per acre 3 to 4 weeks apart 	<p>To improve root development and transplanting shock: Seedling drench: Drench seedling trays at least twice during the seedling stage of which the last one should be 14 days prior to transplanting.</p> <p>To improve head size and yield: If seedling trays were not drenched commence sprays within one week after transplanting, but if drenched, apply 1st spray 14-21 days after transplanting. Apply 2 - 3 further sprays at 21 to 28 day intervals.</p>



Blueberries

Dr. Marietjie Stander



UV chromatograms of the **anthocyanidins** in the blueberries at 499 nm:

465= delphinidin-3-glucoside

435=delphinidin-3-arabinsoside

479=putinidin-3-glucoside

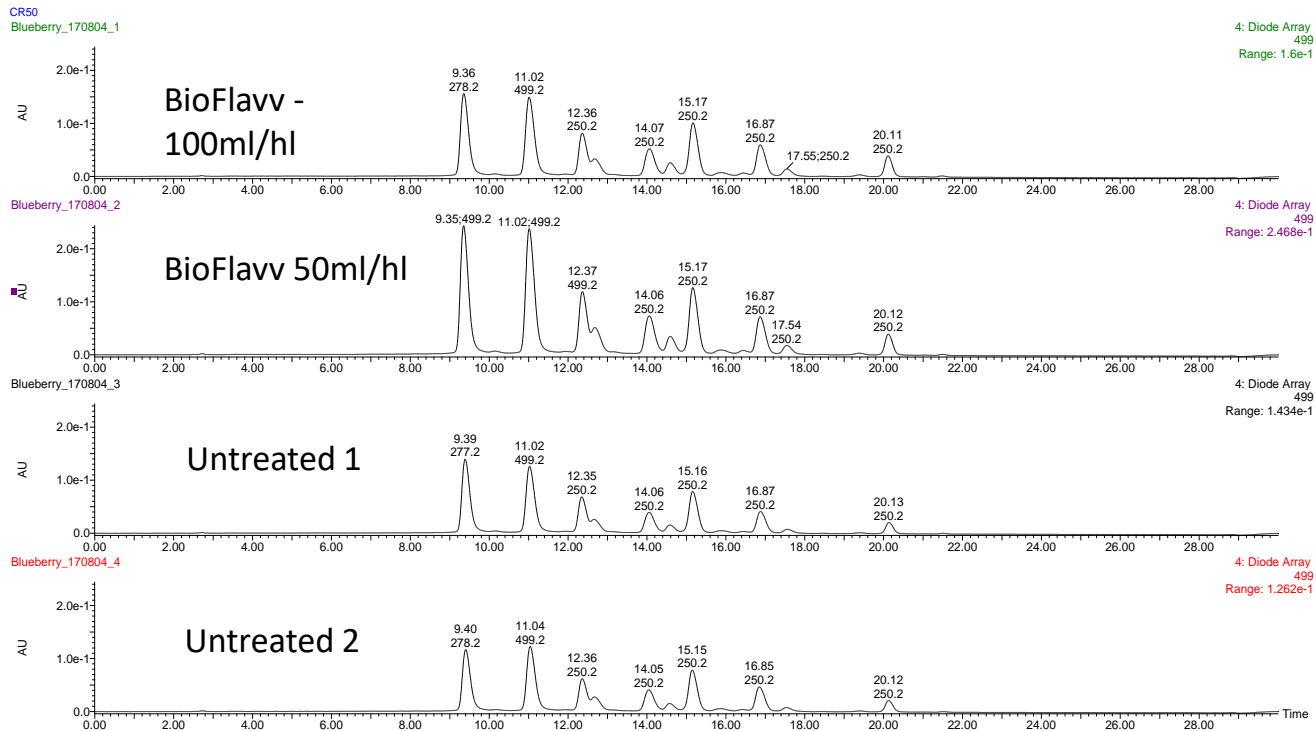
449=putinidin-3-arabinsoside

493= malvidin-3-glucoside

463= malvidin-3-arabinsoside

521=Petunidin 3-acetylglucoside

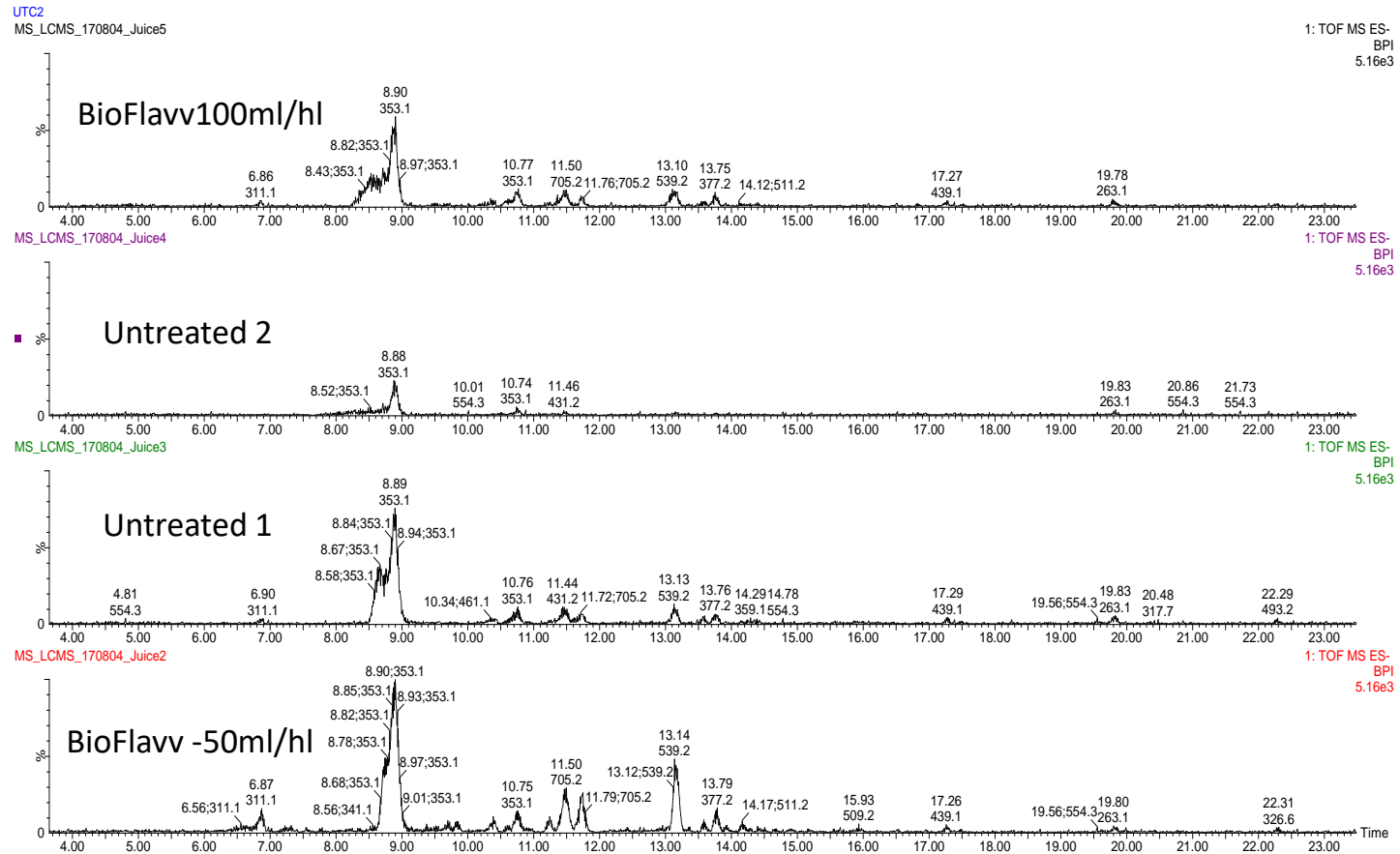
535=Malvidin 3-acetylglucoside





Blueberries

Phenolic compounds present in blueberry juice





Natural Biostimulant Innovations



BioFlavv™ Effects on Fruit & Nut Orchards

Untreated

Macadamia Nuts

Treated



Macadamia Nuts

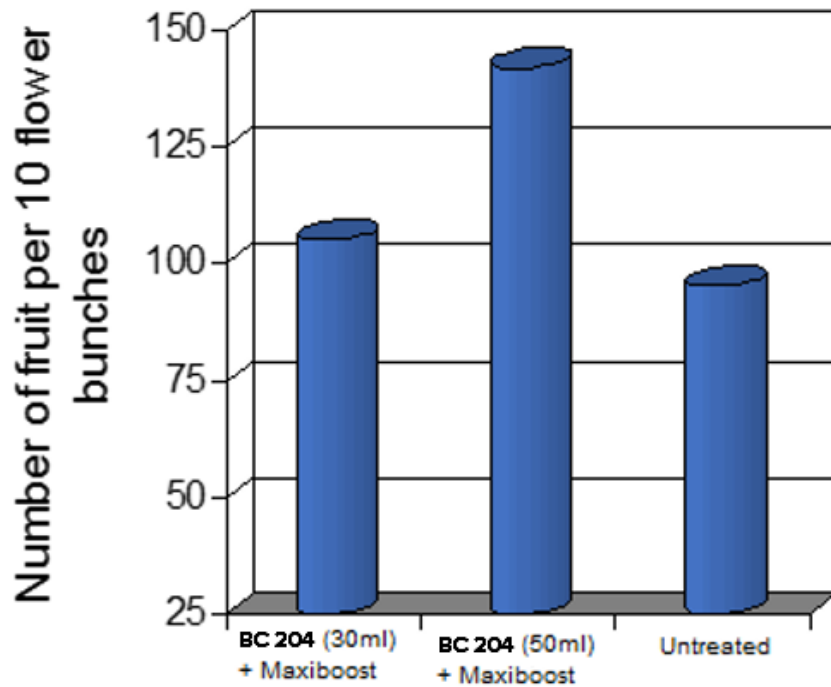
Length of flowers – up to 300 ml



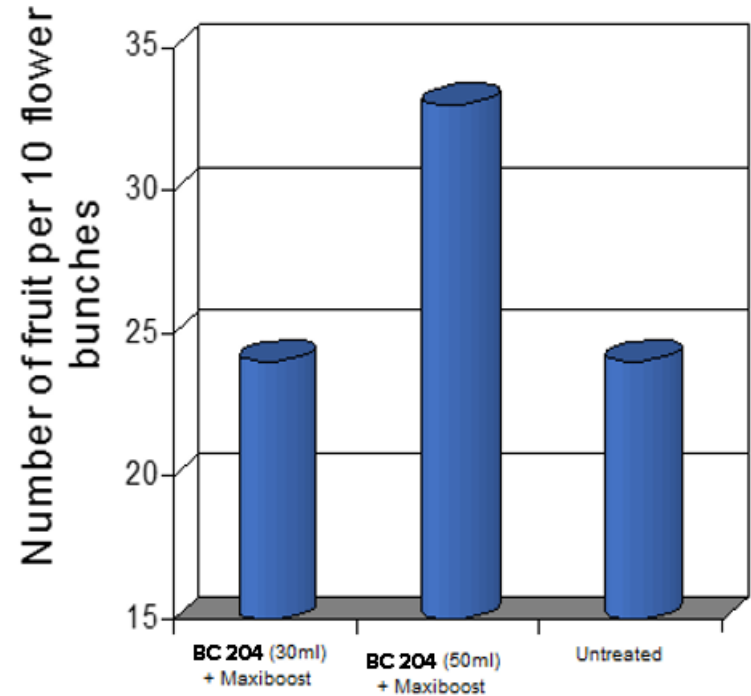
3 stages of flowers – 80% of trees



Macadamia Nuts



BC204 = BioFlavv



Assessment date: 29 November after natural fruit drop stopped

Apples

BioFlavv on the incidence of Bitter pit in Panorama Golden apples after cold storage at 4 °C for 26 days.

**7 times
Calcium nitrate
sprays**



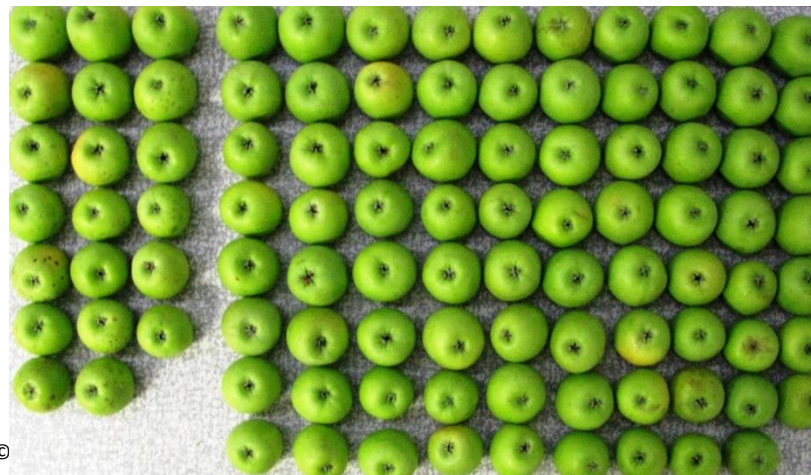
Bitter pit: 75%

Russeting:
(% Class I fruit)

Stem end: 56%

Retiform: 46%

**7 times
Calcium nitrate
Sprays + BioFlavv@
500ml/ha**



Bitter pit: 20 %

Russeting:
(% Class I fruit)

Stem end: 95%

Retiform: 78%

**Mid October 2010
Mid November 2010
Mid December 2010**

Apples

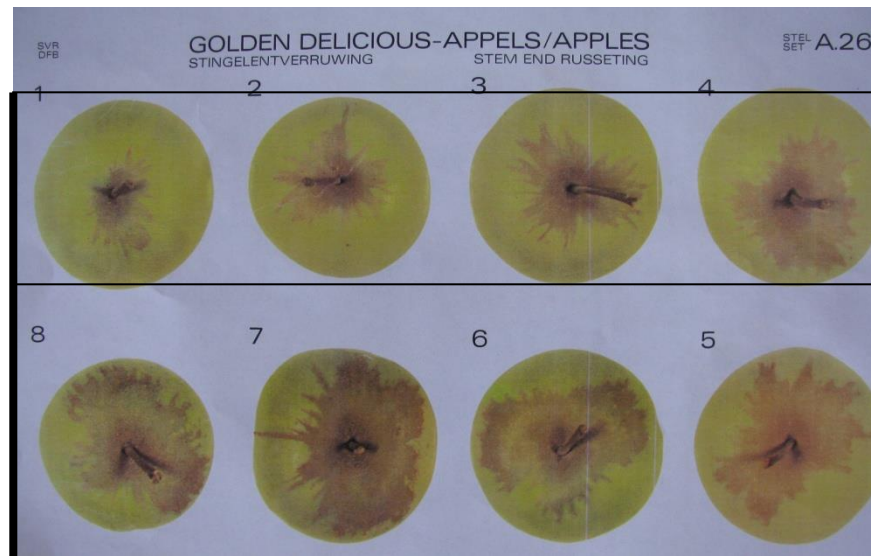
Aging of cut Panorama Golden Delicious apples treated with BioFlavv compared to untreated fruit when kept after harvest at room temperature for 15 days



Apples

Color Charts for Russeting assessments

Stem end



Class I

Retiform

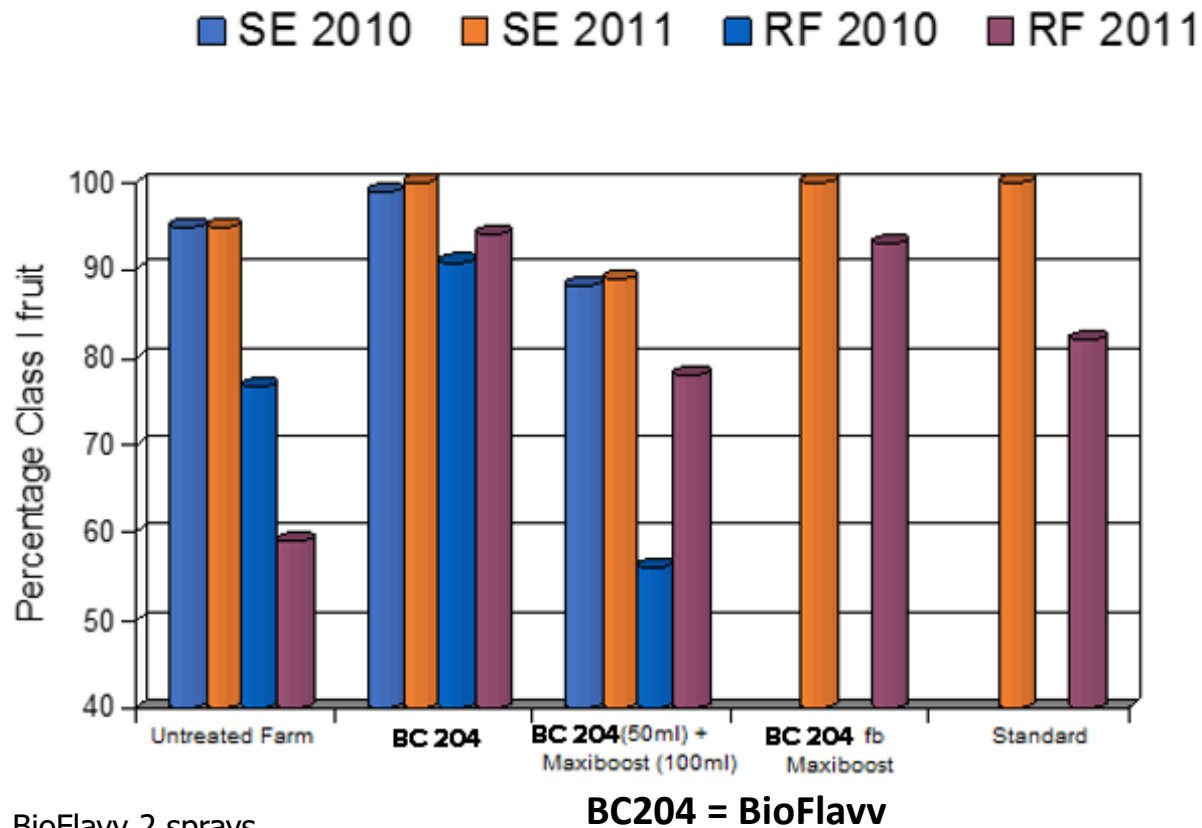


Class I

Apples

Russeting

Apples: Panorama Goldens: 2010 vs 2011
Percentage fruit in Class I (export)



2010: BioFlavv 4 sprays

2011: BioFlavv 3 sprays

2011: BioFlavv fb fertilizer . BioFlavv 2 sprays

Timing: Started at 90 % petal drop fb month applications

BioFlavv concentration: 50ml / hl

Apples

Pink Lady Fruit Finish at harvest (Culled fruit)

Control (43%)

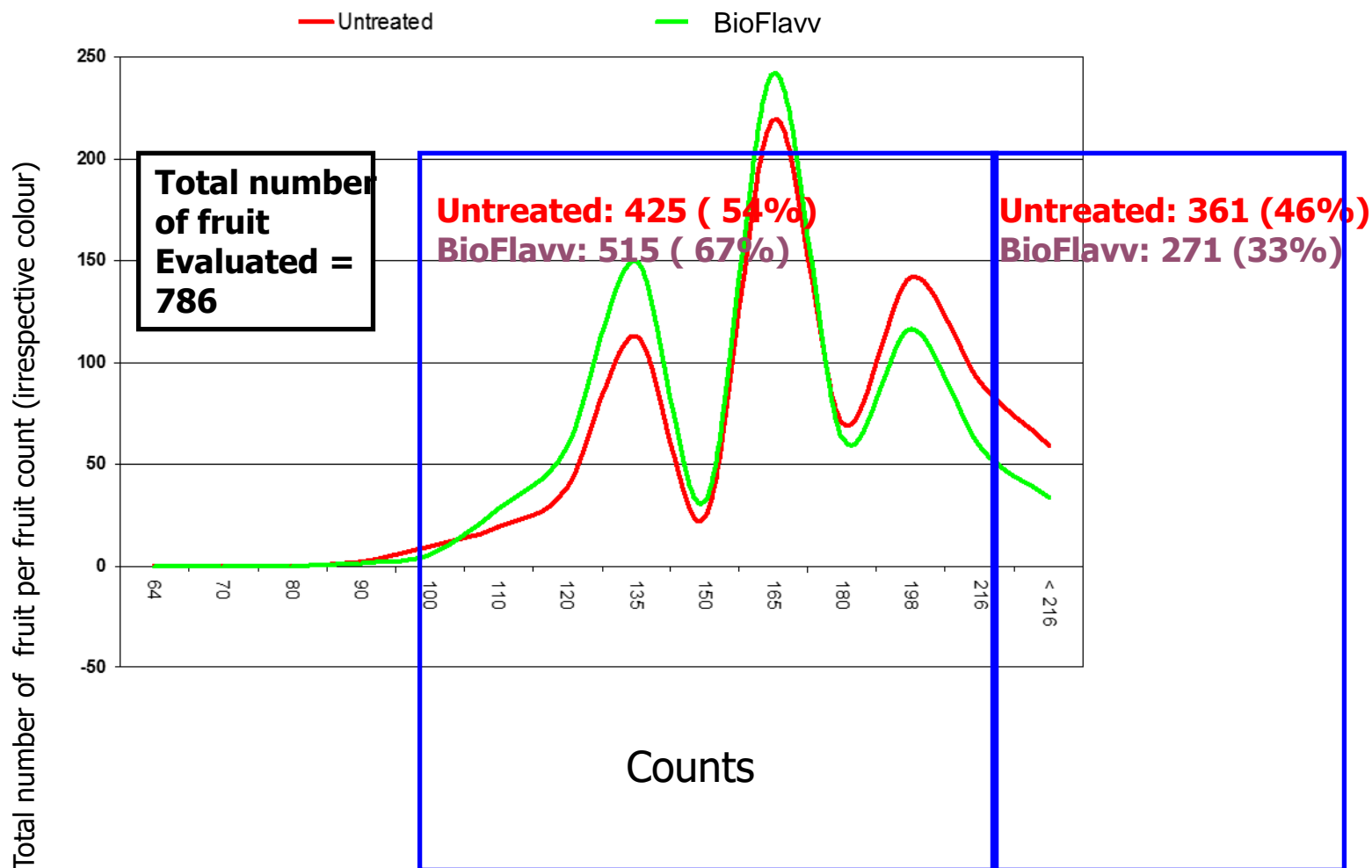
4 x Monthly applications

BioFlavv (16%)



Apples

BioFlavv on number of fruit / count; Applethwait, Elgin, 2011 (Applications: 2X BioFlavv @ 500ml / ha 10 and 5 days before harvest)



TOBACCO

Untreated



Treated



Untreated



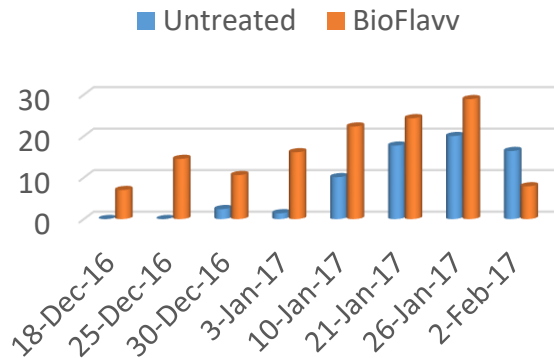
Treated



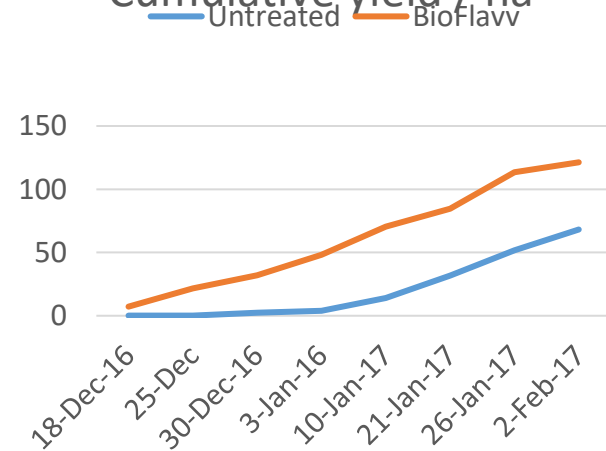
Tomatoes

Effect of BioFlavv on tomato(Oxheart) yield and cumulative yield / ha over time (2017)

Yield / ha / assessment date



Cumulative yield / ha



Application dates

27 Aug 16 (Seedling tray drench)
 29 August 16: Planting date:
 29 Sep 16
 02 Nov 16
 02 Dec 16
 30 Dec 16

Dosage BioFlavv / ha

50ml / hl
 63,4ml
 166ml
 225ml
 285ml

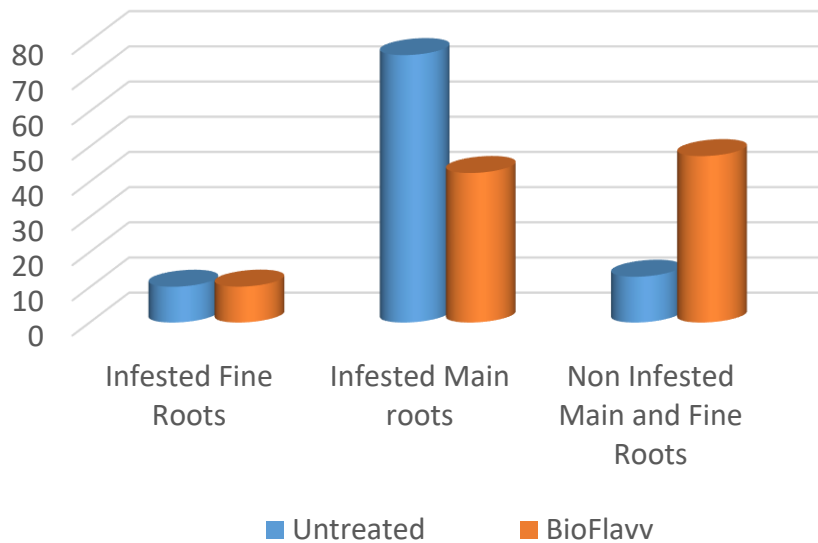
Volume of spray mixture / ha

126L
 333L
 443L
 570L

Tomatoes

Effect of BioFlavv on the incidence of root knot nematode infestation of Oxheart tomatoes

Percentage Roots per mass infested with root knot nematodes



Untreated BioFlavv treated

Infested fine roots



Infested Main roots



Non-Infested Main + Fine roots





Natural Biostimulant Innovations



BioFlavv™ Effects on Greenhouse Fruits & Vegetables

Production Greenhouses

Baby Spinach



Tomatoes



Without BioFlavv

With BioFlavv

Agroworld

Natural Biostimulant Innovations



McGill University Field Trials 2021,22 Flavonoids (BioFlavv), CFS (BioSignall) & BioTotal (Combined) *Yield, quality & stress trials*

McGill Salt Stressed
Soybean Trials w/BioFlavv



Agroworld
Reclaiming our planet

**McGill University Project
BioSignall, BioFlavv, BioTotal on Vegetables
Summer 2020**

Zucchini 27 July 2020 Canada



Greenhouse Zucchini



Zucchini Transplanting



Zucchini Flowering



Zucchini Flowering
Trial Blocks Marked



Foliar Spraying Backpack

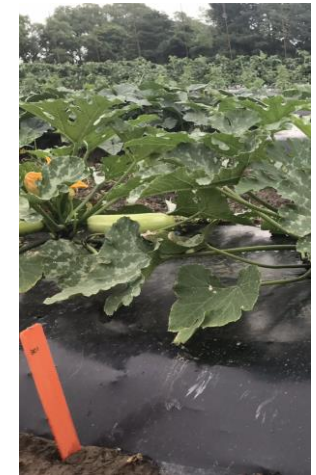


Quality & Yield Measuring



Foliar Spray

Zucchini Foliar Spray



Zucchini 27 July



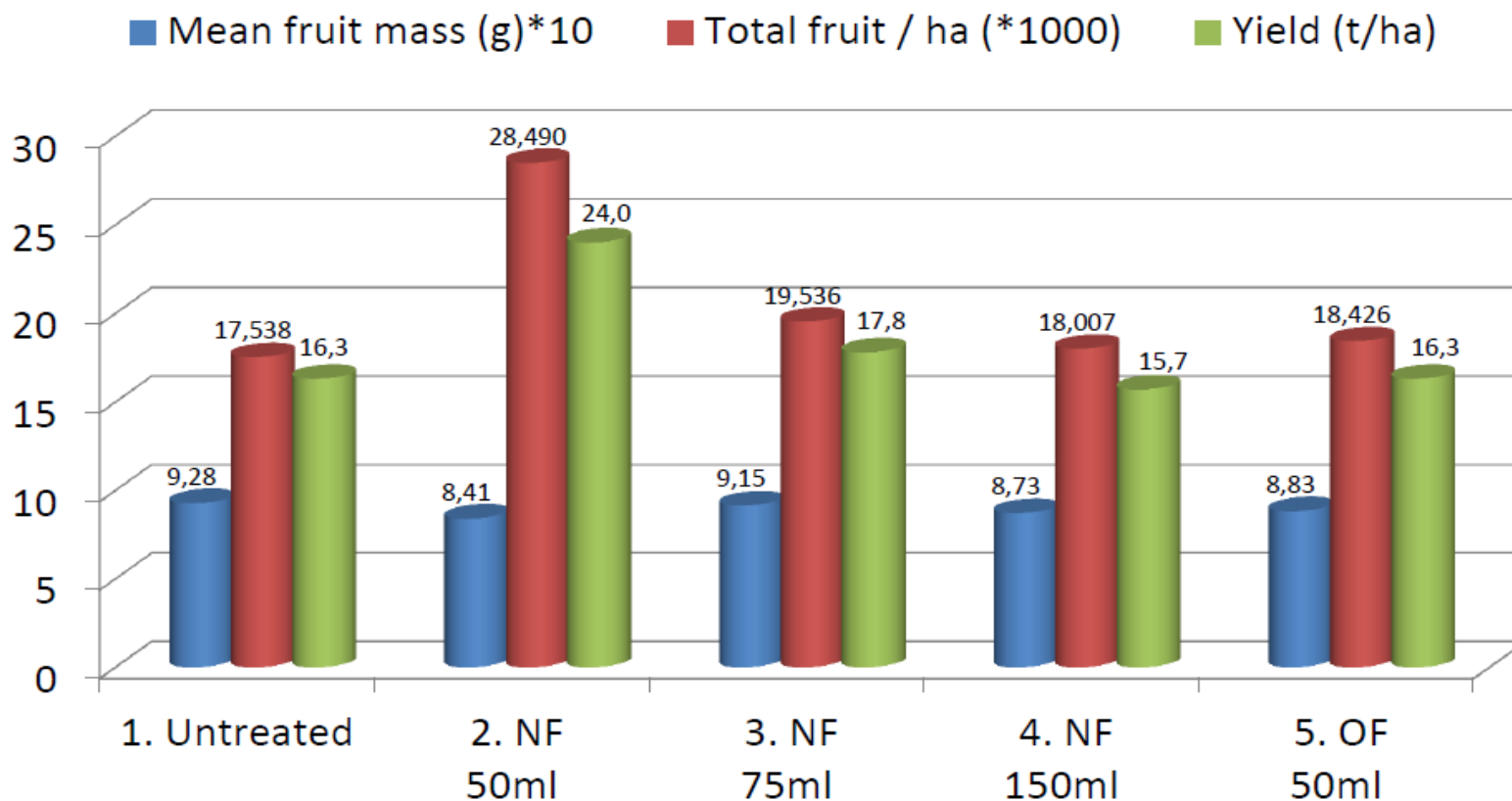
Natural Biostimulant Innovations



BioFlavv: Versus the flavonoid competition

Effect of different concentrations of the NF and one concentration with OF on fruit mass (g), number of fruit / ha and yield in ton / ha

CONFIDENTIAL



NF: New formulation
OF: Old formulation

Direct Competition Flavonoids

Benefits of Significantly Higher levels of Crop Nutrients with BioFlavv Product compared to competition:

- Increased yield
- Stress resilience, yield, crop quality,
- Nutrient increase in food crops
- Plant & soil health improvements
- Organic (conventional and organic crops)
- Reduced macro/micro nutrient replacement in next year



Grain, fruits, wine grapes, vegetables crops

Measurement Parameter 2021 Field Trials	AgroWorld BioFlavv™ Increased Nutrients following an application of BioFlavv compared to the competitive flavonoid product
Nitrogen	+23%
Phosphorus	+65%
Potassium	+16%
Calcium	+26%
Magnesium	+12%
Sulphur	+13%
Zinc	+12%
Boron	+22%
Data obtained from independent field trials 2021	

Thank You/ Merci/謝謝/Gracias

Help the plant to help itself

Robert F. Lee,
robert@agroworld.farm
+1-514-691-8732



McGill Trials
Chili Transplant Q2 2020



Disclaimer

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February 13, 2019

AgroWorld identified as the commercialization partner for the AAFC grant



AgroWorld representatives (image on left) were present at the AAFC grant announcement MacDonald Campus of McGill University on Monday and introduced as the commercialization partner for this important Government Of Canada initiative. The role of Agroworld will be to market cutting edge signalling and plant extract agricultural products to our extensive distribution network in the USA and Canada. External media links :

[Federal Government Invests In Bioeconomy](#)

[The Government of Canada invests in innovation to help grow Canada's bioeconomy](#)

[Canada invests in biomass research cluster to grow bioeconomy](#)

Partnership

