



Cultivated Garden

Presented by:
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& Matthew Brecht, Ph.D.

Safe Harbor



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Product names -- including Regalia[®], Stargus[®], Grandevo[®] WDG, Grandevo[®] CG, Venerate[®] XC, Venerate[®] CG, Majestene[®], Haven[®], Amplitude[®], Zelto[®], Zequanox[®] and Jet-Ag[®] - are trademarks or registered trademarks of Marrone Bio Innovations.

Company Overview










- Incorporated June 2006
- 7 commercially available MBI actives
- ~110 employees, 1/3 in R&D
- Library of 18,000+ proprietary microorganisms screened against multiple targets
- Wholly-owned fermentation facility in Bangor, MI
- Commercial sales in N. America, LATAM, Africa, & Mideast
- Listed on NASDAQ as MBII in 2013



Unique Patented Bioprotection Portfolio



Product	What is it?	Category	What Does it Do?
	Knotweed extract	Fungicide/ Plant Health	<ul style="list-style-type: none"> Controls plant diseases and improves plant health Strong on powdery mildew
	Unique <u>strain</u> of <i>Bacillus</i> bacteria		<ul style="list-style-type: none"> Controls plant diseases and improves plant health Strong on downy mildews, white and gray molds
	New <u>species</u> of bacteria	Insecticide and Nematicide	<ul style="list-style-type: none"> Stops feeding and reproduction of a broad range of chewing and sucking insects, mites and flies
	New <u>species</u> of bacteria		<ul style="list-style-type: none"> Stops development of a broad range of chewing and sucking insects, mites and flies
	New <u>species</u> of bacteria		<ul style="list-style-type: none"> Controls broad spectrum of root-feeding nematodes to increase yields & quality
	Coconut oil extract	Crop Stress Reduction	<ul style="list-style-type: none"> Reduces sun & water stress, increasing yields & quality
	Disinfectant	Fungicide/ bactericide	<ul style="list-style-type: none"> Broad spectrum control of fungal and bacterial diseases

Strong IP Portfolio of over 400 pending and issued patents

Key Account Manager, Cultivated Garden



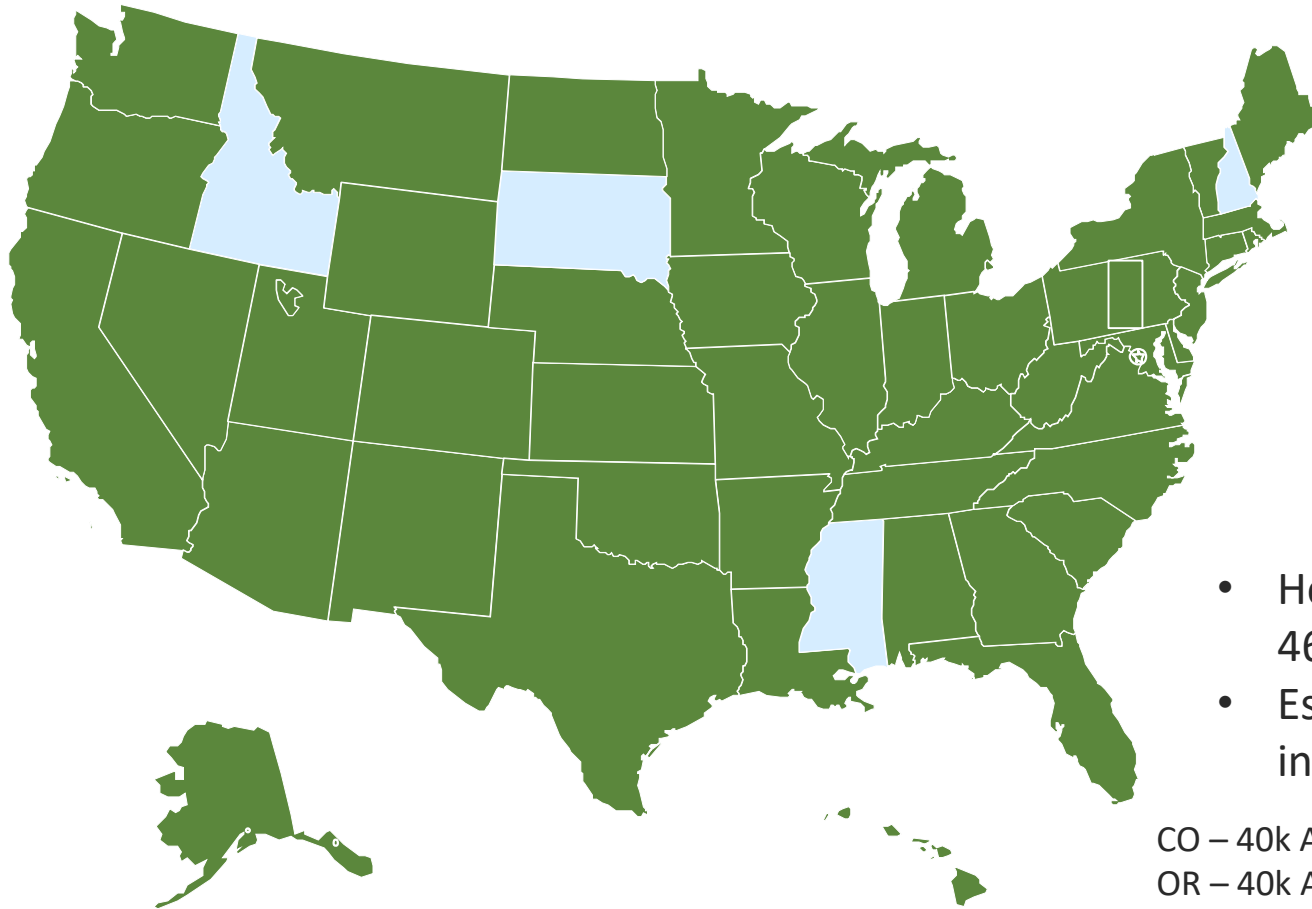
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CBD Hemp



Hemp Farming Legalization



- Hemp farming is legal in 46 states
- Estimated 250,000 A Grown in US 2019

CO – 40k A	OK – 21k A	AZ – 3k A
OR – 40k A	NC – 15k A	VA – 3k A
WA – 30k A	CA – 10k A	SC – 2k A
MO – 25k A	NV – 5k A	NY – 2k A
KY – 25k A	AL – 7k A	PA – 1k A
TN – 22k	VT – 3k A	

Cannabis Species



Indica

Origin: mostly central Asia and the Indian subcontinent

Cultivation: 45-60 days to flower, higher yields, good for indoor grows

Plant features: short, sturdy, and bushy with wide leaves

Bud features: dense with pungent aromas, sometimes purple

Treats: insomnia, chronic pain, anxiety, loss of appetite

Popular Strains:



Purple Kush



Granddaddy Purple



Northern Lights

Sativa

Origin: equatorial climates such as Thailand, southern Africa, and Mexico

Cultivation: 60-90 days to flower, good for outdoor grows in warm climates

Plant features: tall with thin leaves

Bud features: lighter weight with subtle fruity aromas, sometimes hints of red and orange

Treats: creative blocks, lack of focus, depression, fatigue

Popular Strains:



Sour Diesel



Green Crack

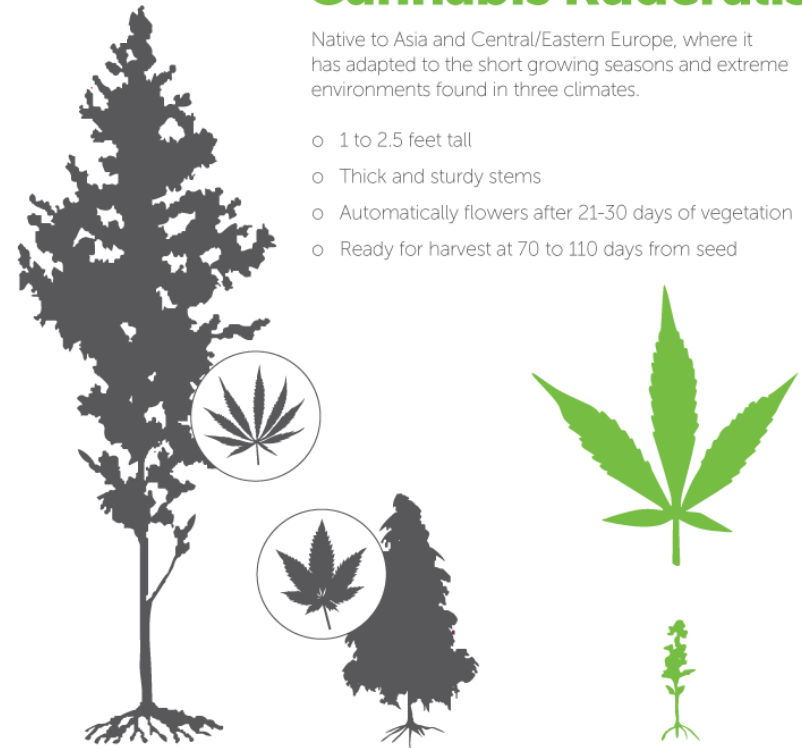


Amnesia Haze

Cannabis Ruderalis

Native to Asia and Central/Eastern Europe, where it has adapted to the short growing seasons and extreme environments found in three climates.

- o 1 to 2.5 feet tall
- o Thick and sturdy stems
- o Automatically flowers after 21-30 days of vegetation
- o Ready for harvest at 70 to 110 days from seed



SATIVA

INDICA

RUDERALIS

Resource: Leafly.com

Male Cannabis Pollen Sacs



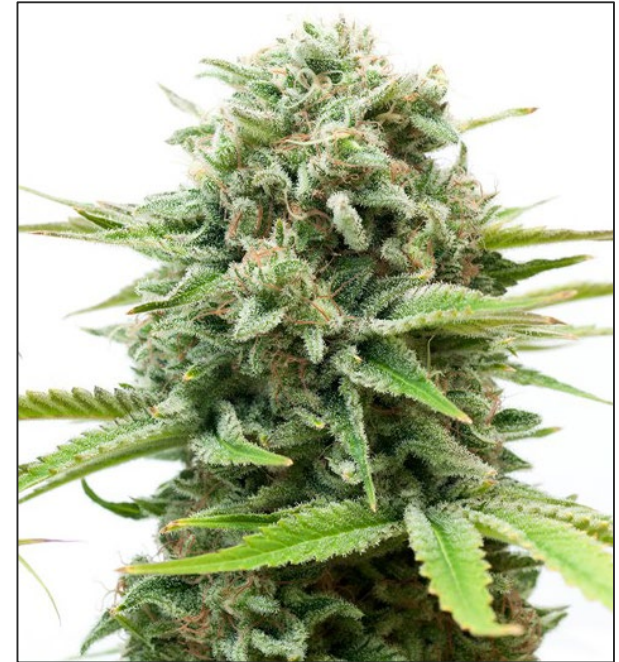
Female Cannabis Flower



Female

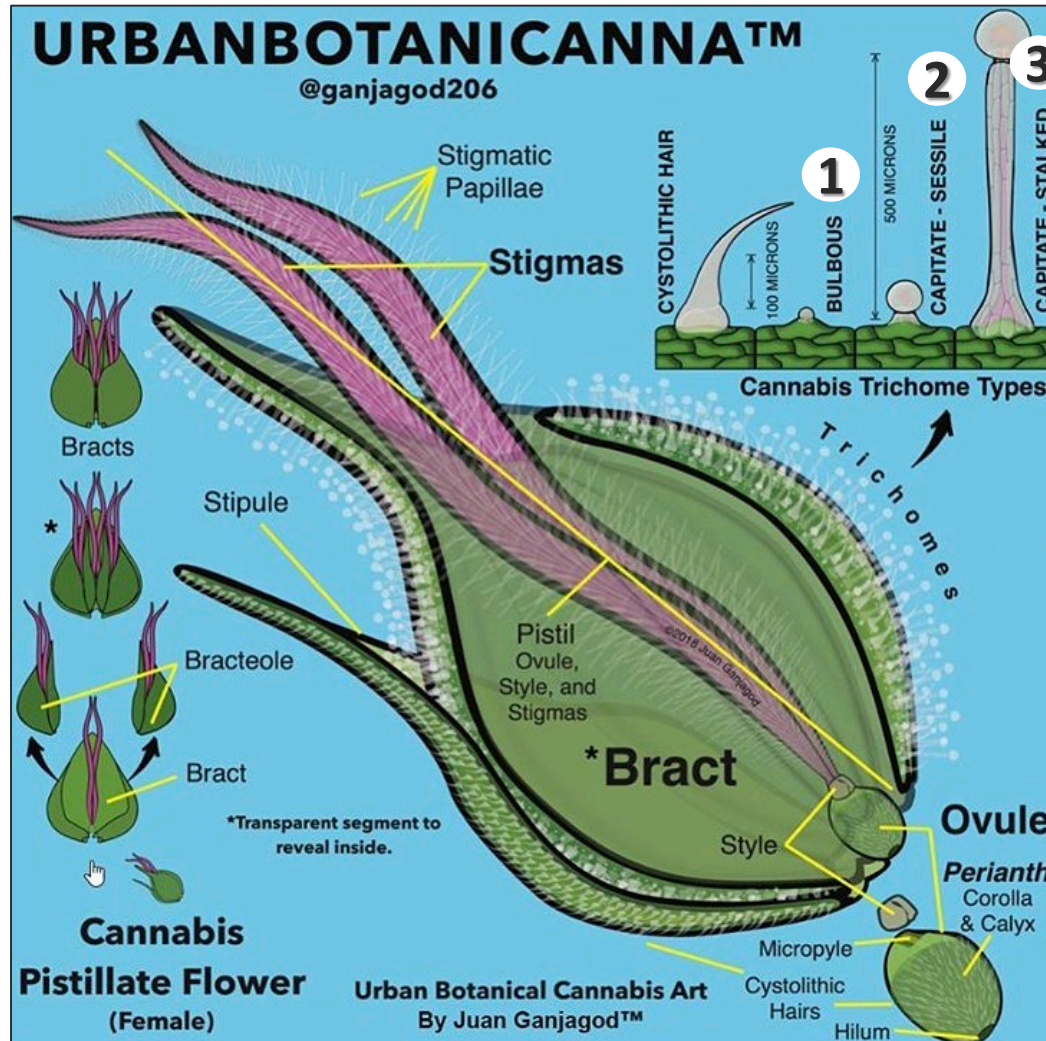


Early 4 weeks into Flower



Mature Flower

Types of Trichomes



1. Bulbous
2. Capitata Sessile
3. Capitata Stalked

Resource: Instagram/ganjagod206

Medical Benefits/Claims of Cannabidiol (CBD)



- Pain Relief
- Anti-cancer
- Anti-anxiety
- Anti-seizure
- Anti-psychotic
- Anti-inflammatory
- Muscle relaxant
- Neuroprotective



CBD shows promise in the treatment of several conditions:

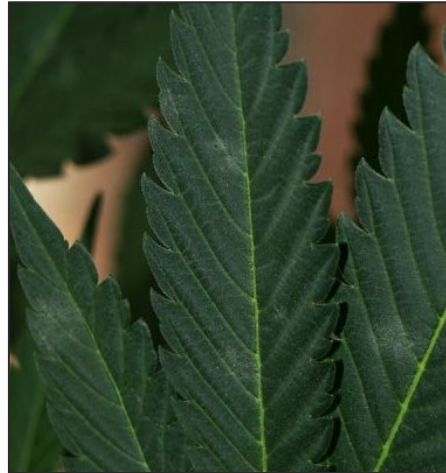
- Chronic Pain
- Hepatitis C, especially active disease – reduces inflammation and fibrosis
- Psychiatric illnesses – anxiety, bipolar, schizophrenia and depression.
- Seizure disorders and other central nervous system conditions
- Insomnia
- Inflammatory disorders, such as rheumatoid arthritis

Fusarium oxysporum, *Pythium*



- Regalia CG, PAA (ex. Jet-Ag[®] 5%)
- Micronized Sulphur
- Microbial inoculums
- *Bacillus* spp. (ex. Stargus[®])
- *Trichoderma* and *Streptomyces* (ex. TerraGrow[®], RootShield[®])
- Compost teas

Powdery Mildew



- Regalia[®] CG
- Sulfur
- Microbial inoculums
Bacillus spp.
(ex. Stargus[®])
- PAA (ex. Jet-Ag[®])
- MilStop[®]

Botrytis cinerea – Bud Rot



- Regalia[®] CG
- PAA (ex. Jet-Ag[®] 5%)
- Stargus[®]
- BotryStop
- Actinovate[®]

Southern Hemp Blight - *S. rolfsii*



- Microbial inoculums - *Bacillus spp.* (ex. Stargus®)
- *Trichoderma* and *Streptomyces* (ex. TerraGrow®, RootShield®)
- Regalia® CG
- PAA (ex. Jet-Ag® 5%)

Verticillium Root and Stem Rot



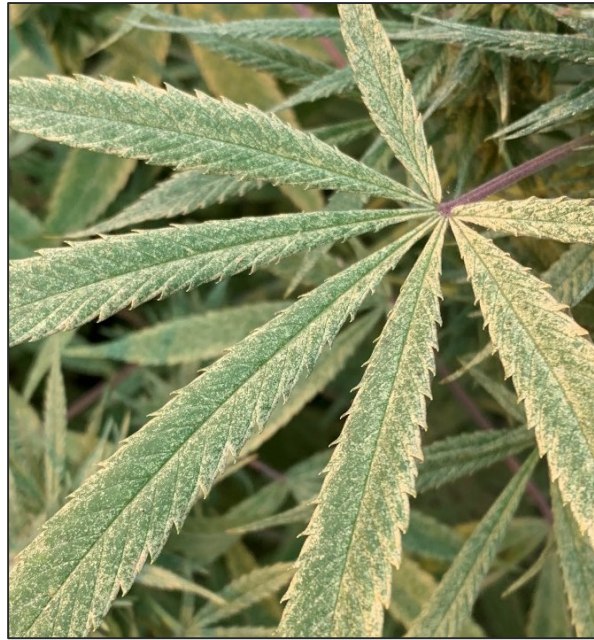
- Regalia® CG
- Microbial inoculums - *Bacillus spp.* (ex. Stargus®)
- *Trichoderma* and *Streptomyces* (ex. TerraGrow®, RootShield®)
- PAA (ex. Jet-Ag® 5%)

Leaf Spot – *Cercospora*, *Septoria* and *Bipolaris*



- Regalia® CG
- Jet-Ag® 5%
- Sulfur and biologicals (Stargus®)

Spider Mites



- Grandevo[®] CG
- Venerate[®] CG
- M-Pede[®]
- Azadirachtin
- SuffOil-X[®]
- Trilogy[®] (Neem oils)
- Pyganic[®]
- BCAs (*Amblyseius californicus*, *andersoni*, *fallacis*, *Phytoseiulus persimilis*, *Feltiella acarisuga*)

Thrips



- Grandevo[®] CG
- Venerate[®] CG
- M-Pede[®]
- Azadirachtin
- SuffOil-X[®]
- Trilogy[®] (Neem oils)
- Pyganic[®]
- BCAs (*Stratiolaelaps*, *Amblyseius cucumeris*, *degenerans*, *swirskii*; *Orius insidiosus*, *Steinerema feltiae*, *Dalotia* beetles)

Genetic abnormalities - not disease related





Any Questions Thus Far?

VP of Field Development and Technical Service



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Regalia® CG: Extract of *Reynoutria sachalinensis*



- Broad spectrum fungicide based upon triggering plant defense mechanisms (ISR/SAR)
- Plant health effect by increasing leaf chlorophyll content
- Powdery mildews on cannabis, hemp, cane berries, strawberry, tomatoes and peppers, cucurbits, Botrytis of cannabis, hemp and tomatoes
- **FRAC group P5**



Mode of Action: Example of Plant Health Benefit



Untreated



Treated with Regalia® CG

Regalia® CG: Controlled Powdery Mildew

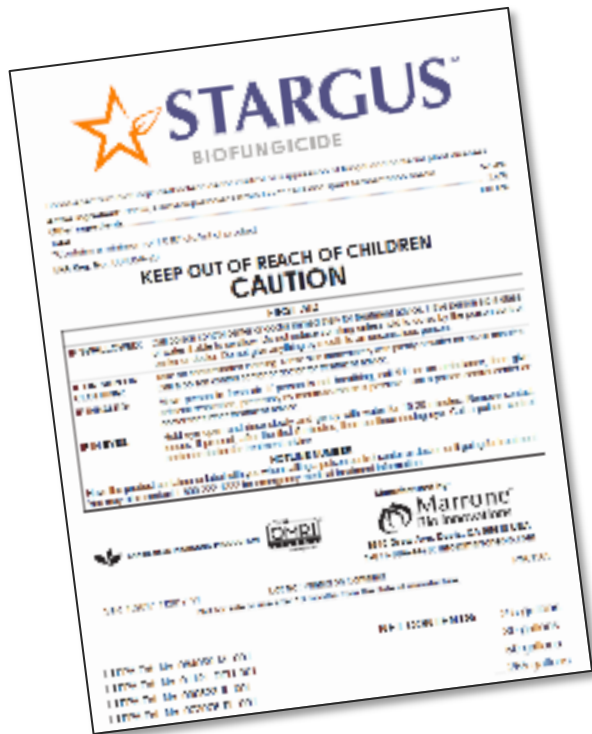


Untreated



Treated with Regalia® CG

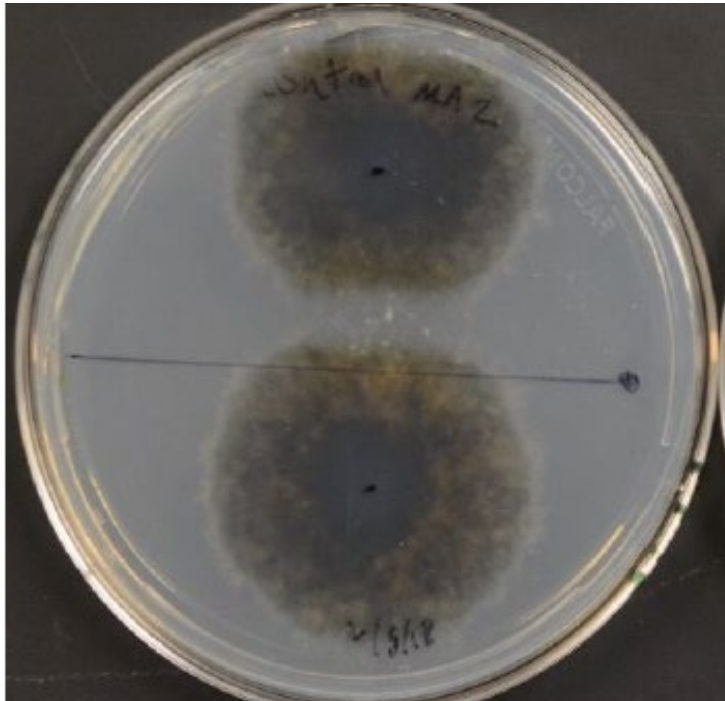
Stargus® Fungicide: What is it?



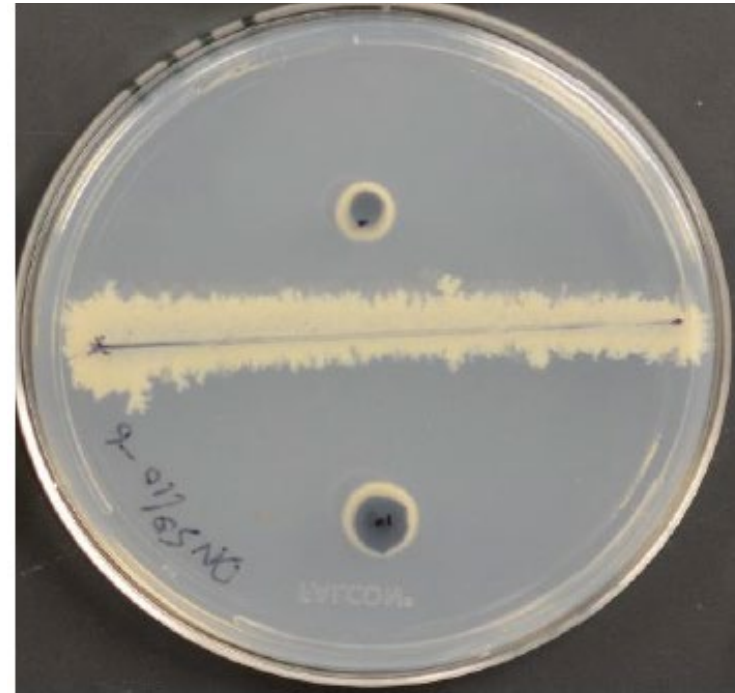
- Liquid fungicide focusing on Botrytis, downy mildew and soil-borne diseases
- Active ingredient is a unique isolate of *Bacillus amyloliquifaciens* (strain F727)
- Broad spectrum biofungicide containing peptides produced during fermentation plus SAR activity
- FRAC code pending



Lipopeptides in Stargus Inhibit Mycelial Growth



Untreated



Treated with Stargus®

Jet-Ag[®]: A Multipurpose Sanitizer



- Contact efficacy against fungal and bacterial diseases
- Can be applied to foliage or soil
- Compatible with most other MBI products
- Contains 4.9% peroxyacetic acid
- Denatures enzymes and proteins in single cell organisms

JET
AG[®]

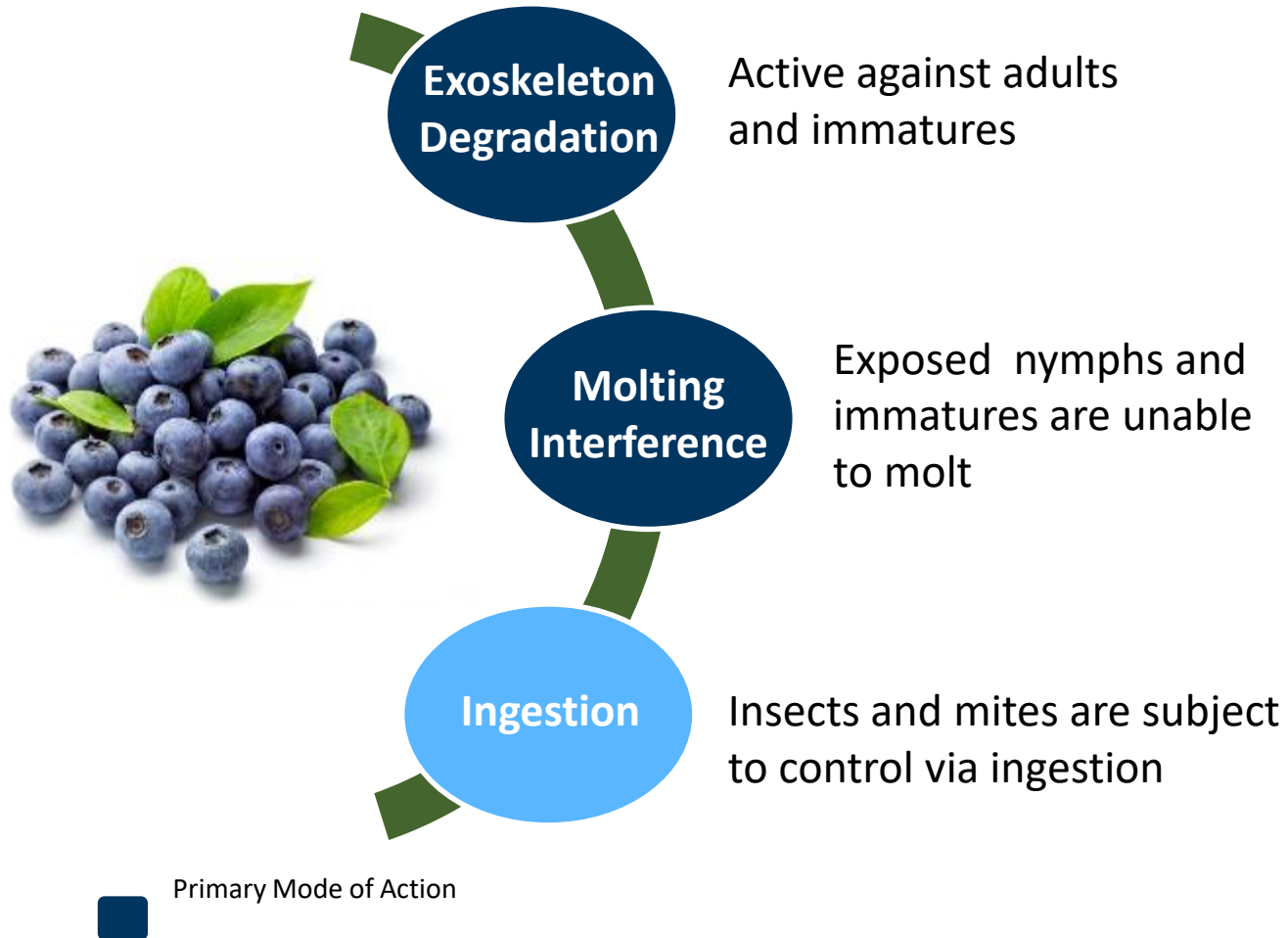
Venerate[®] CG: A Bioinsecticide/Miticide



- Liquid formulation containing 94.46% heat-killed *Burkholderia rinojensis* strain A396 cells and spent fermentation media targeting certain sucking and chewing insects and mites.
 - 1-4 quarts per 100 gallons
 - 4 hr. re-entry interval
 - 0-day pre-harvest interval
 - No residues

 **VENERATE[®] CG**
BIOINSECTICIDE

Venerate® CG: Modes of Action



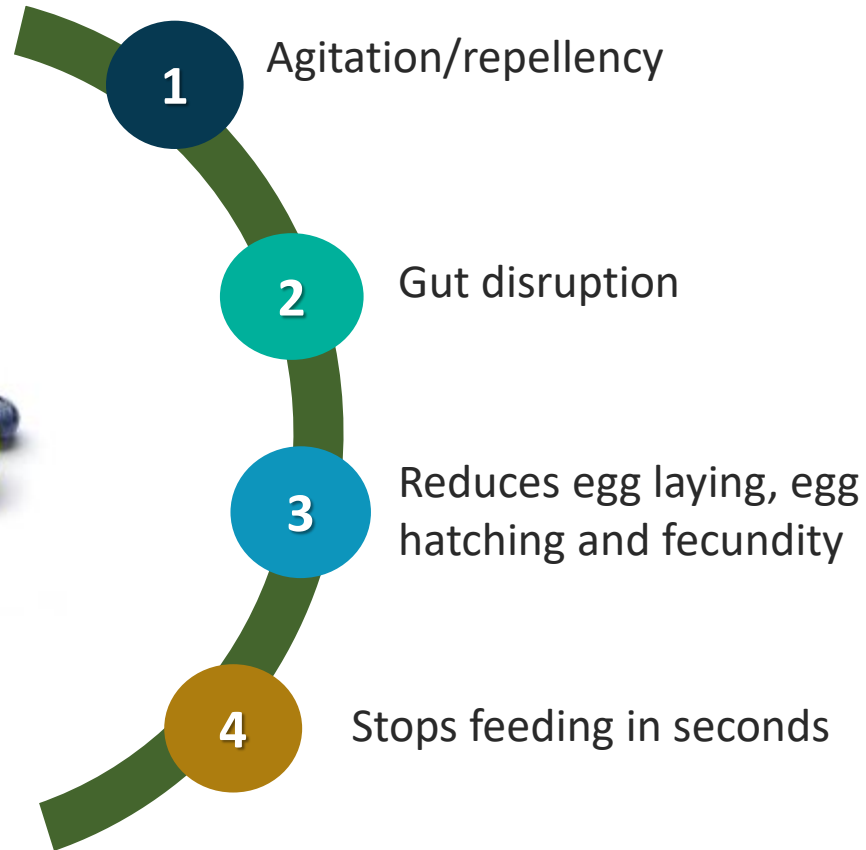
Grandevo® CG: A Bioinsecticide



- Water dispersible granule containing 30% dead *Chromobacterium subtsugae* strain PRAA4-1^T cells and spent fermentation media targeting certain sucking and chewing insects, SWD and mites
 - 1-3 lbs./100 gallons, 2 lbs. most common.
 - 4 hour re-entry interval
 - 0-day pre-harvest interval
 - No residues

GRANDEVO® CG
BIOINSECTICIDE

Grandevo[®] CG: Complex Modes of Action



Powdery Mildew Damage



Cucumber



Severe example of Powdery Mildew

Downy Mildew Damage



Cucumber

Angular Leaf Spot Damage



Cucumber

Early Blight Damage



Tomato

Late Blight Damage



Tomato

White Mold Damage



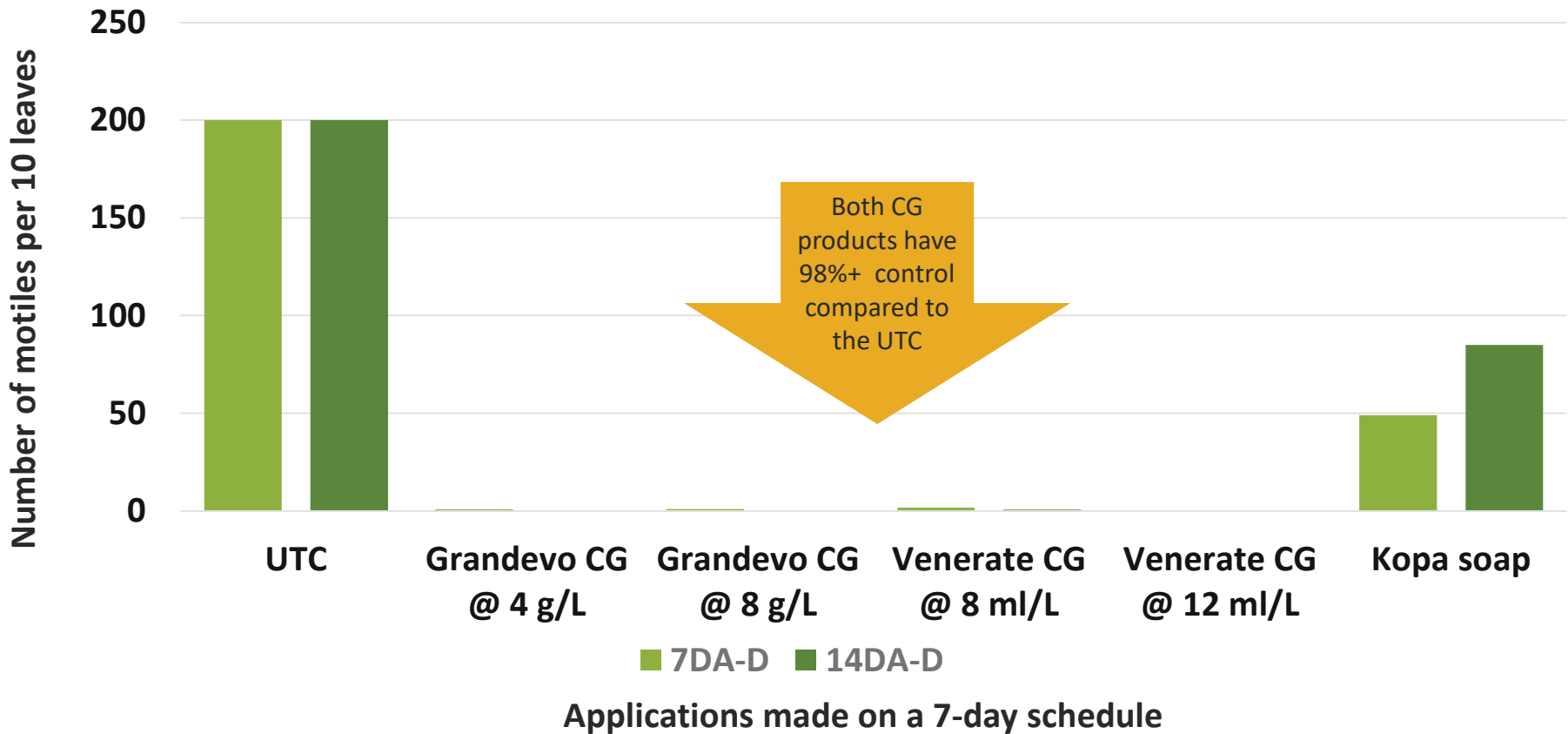
Tomato



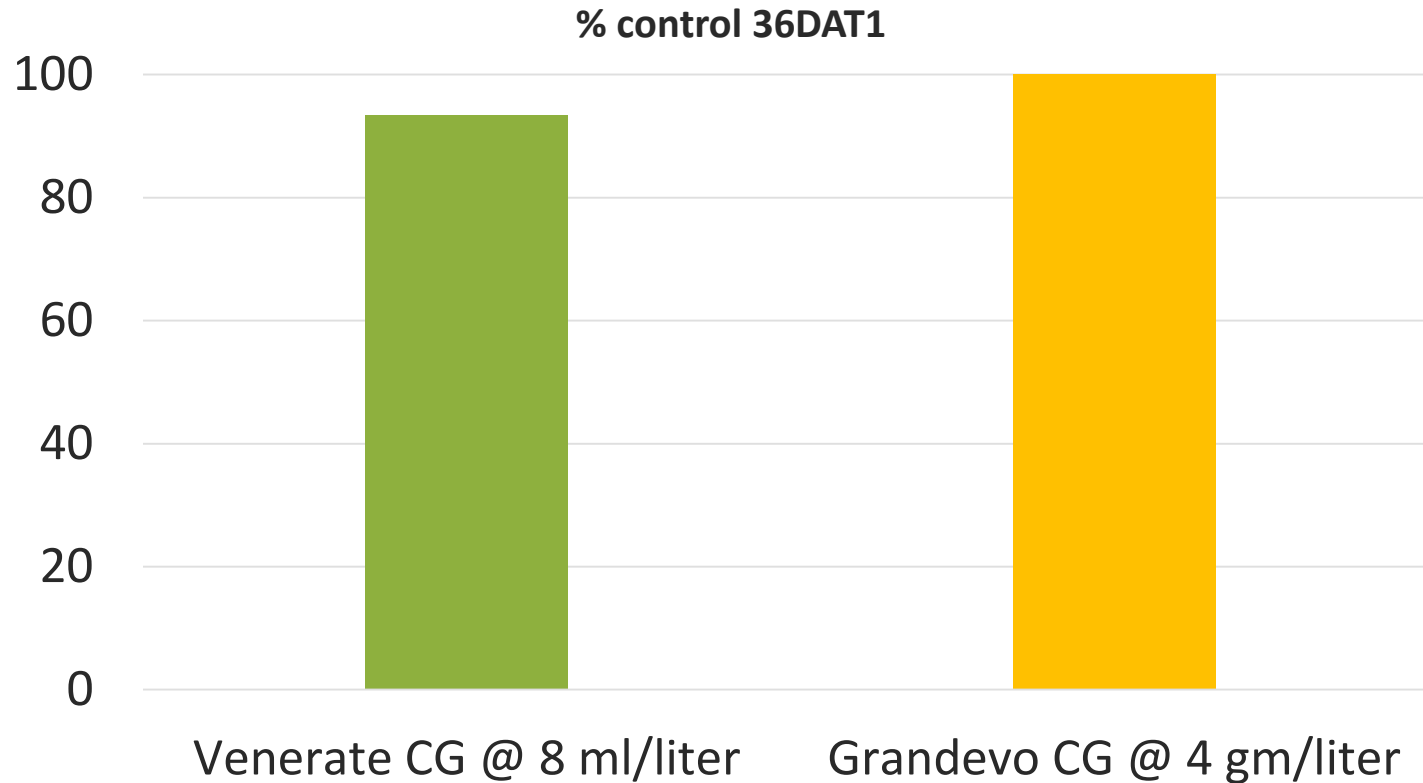
Efficacy on Twospotted Spider Mite



Greenhouse Cannabis, Canada - 2019



Controlling Root Mealybug (*Rhizoecus* sp.)



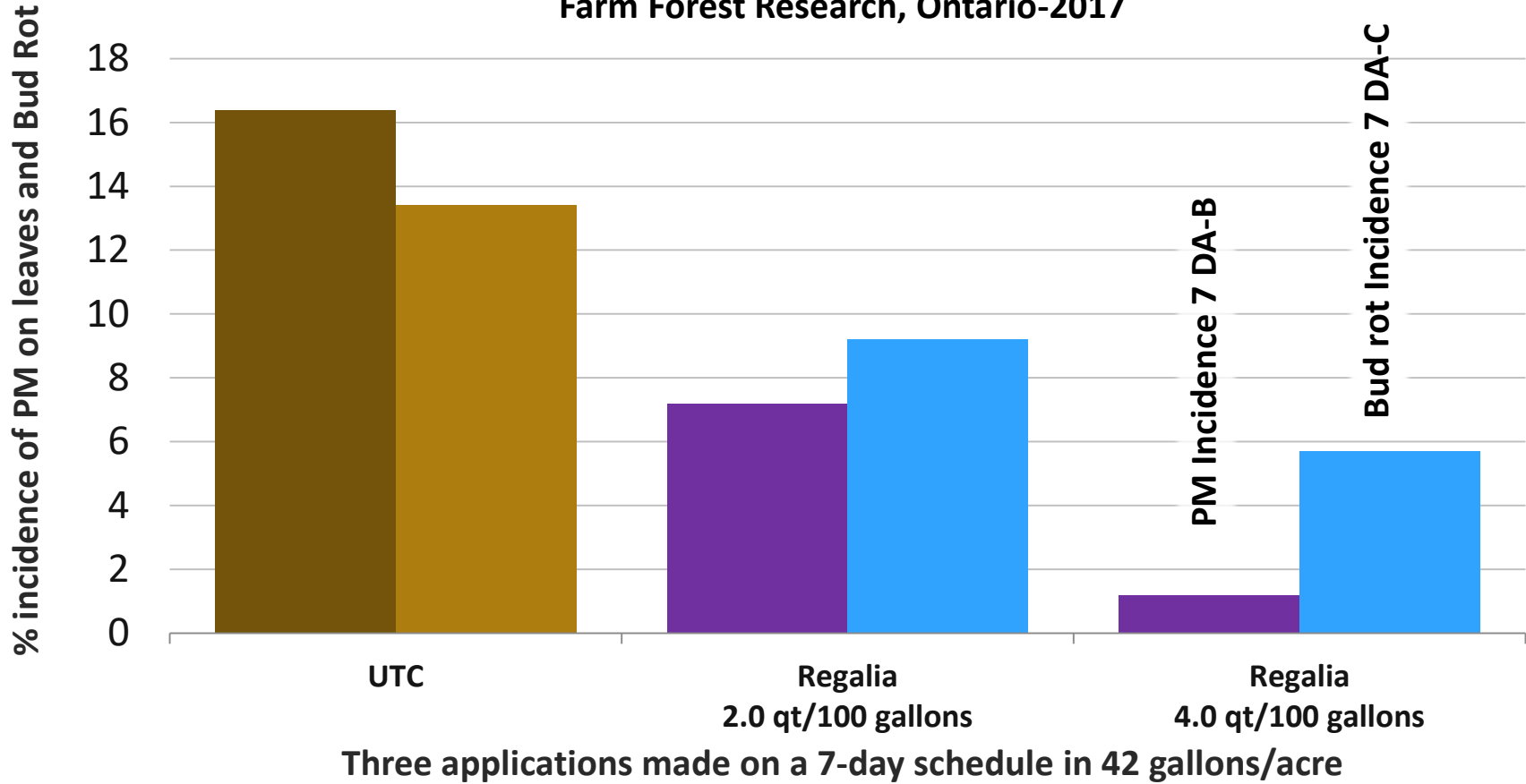
Three drench applications on a 7 day interval to sedum flats, average of 4-8 mealybugs per plant at beginning of study. Non-treated average of 5.6 mealybugs per plant at end of study.

Stanton Gill, U. of Maryland, 2019.

Efficacy on Powdery Mildew and White Mold Bud Rot on Greenhouse Cannabis



Farm Forest Research, Ontario-2017



Pollinator & Beneficial Information



Regalia CG, Stargus, Venerate CG and Grandevo CG are **easy on** beneficial insects*, and, when used as part of an integrated pest management program, can contribute to sustainable farming

*Refer to product labels for restrictions regarding use during pollinator presence, and around bees.

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Trademark Statements



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Questions?