



# BVT - Delivering biologicals to crops using pollinators

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TSXV:BEE

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- ❖ Bee Vectoring Technologies International Inc.
- ❖ Bee Vectoring
- ❖ *Clonostachys rosea* as a tool for disease control
- ❖ Performance of BVT System
- ❖ Summary

# 1. Bee Vectoring Technologies International Inc.

## **BVT: Ag-tech Leader Developing a Disruptive Sustainable Crop Production Tool**

- Use commercial bees to deliver plant treatment agents to crops
- 60 patent applications worldwide covering 5 technology areas

## **Company History**

- Founded 2012
- Publicly traded on Toronto Venture Exchange (TSX.V: BEE); IPO in July 2015

## **BVT Today**

- In rapid commercialization phase (launch in FL this winter, EPA registration 1<sup>st</sup> half 2018)
- Building partnerships with global agri-businesses
- Dual locations:
  - Labs and production facility Mississauga, Ontario
  - Business HQ in N. California (Sacramento area)



## 2. Bee Vectoring: An Alternative to Spraying

*Use of commercial bees to deliver control agents to flowering crops to manage crop diseases and pests and enhance quality and yield of crops*

### Rationale for Vectoring:

- ❖ Same principles as natural pollination
- ❖ The flower is the primary portal of entry for many diseases & insects
- ❖ Targeted daily delivery to the flowers, a major portal of entry for pathogens
- ❖ Flowers are the best place for the active ingredient to inoculate the plant

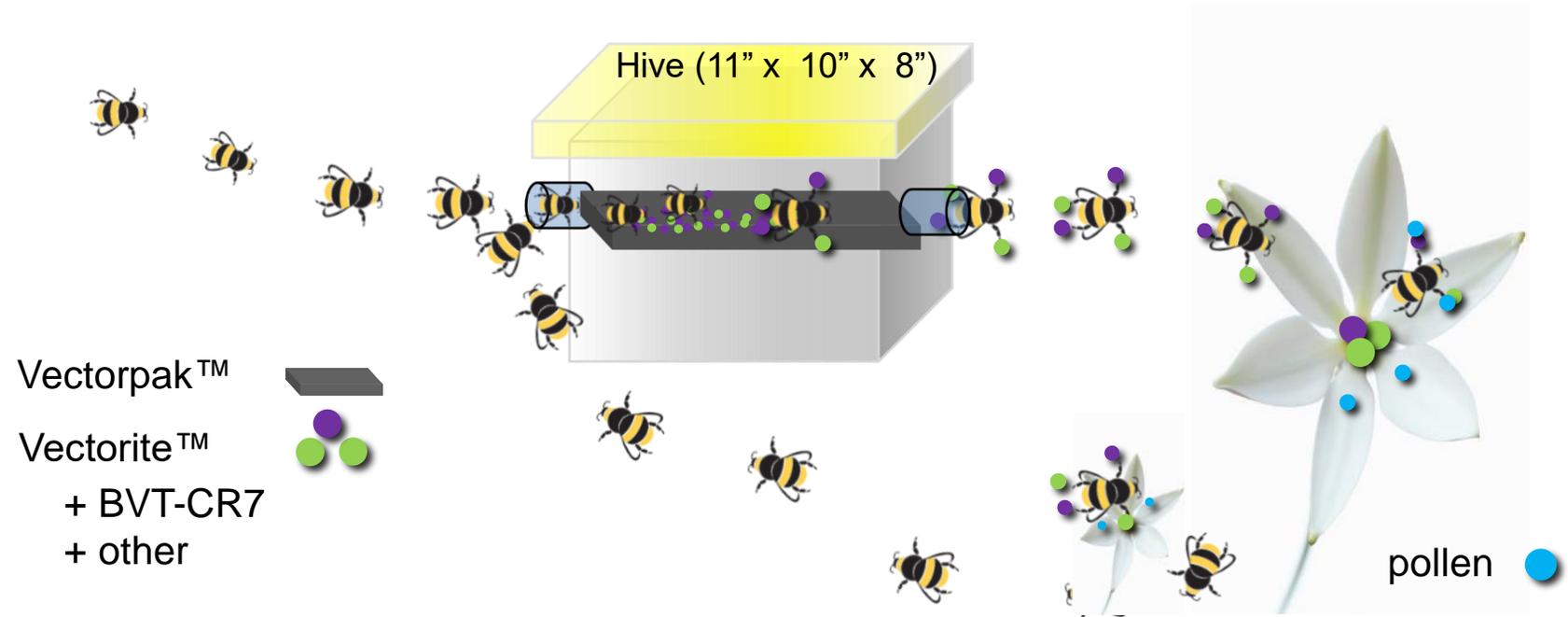
### Benefits of Vectoring:

- ❖ Minimizes waste of active ingredient
- ❖ No water
- ❖ Bees deliver control agent(s) continually throughout the bloom period; more efficient than spray programs which may miss many blooms in between sprays
- ❖ Can deliver multiple products at a time

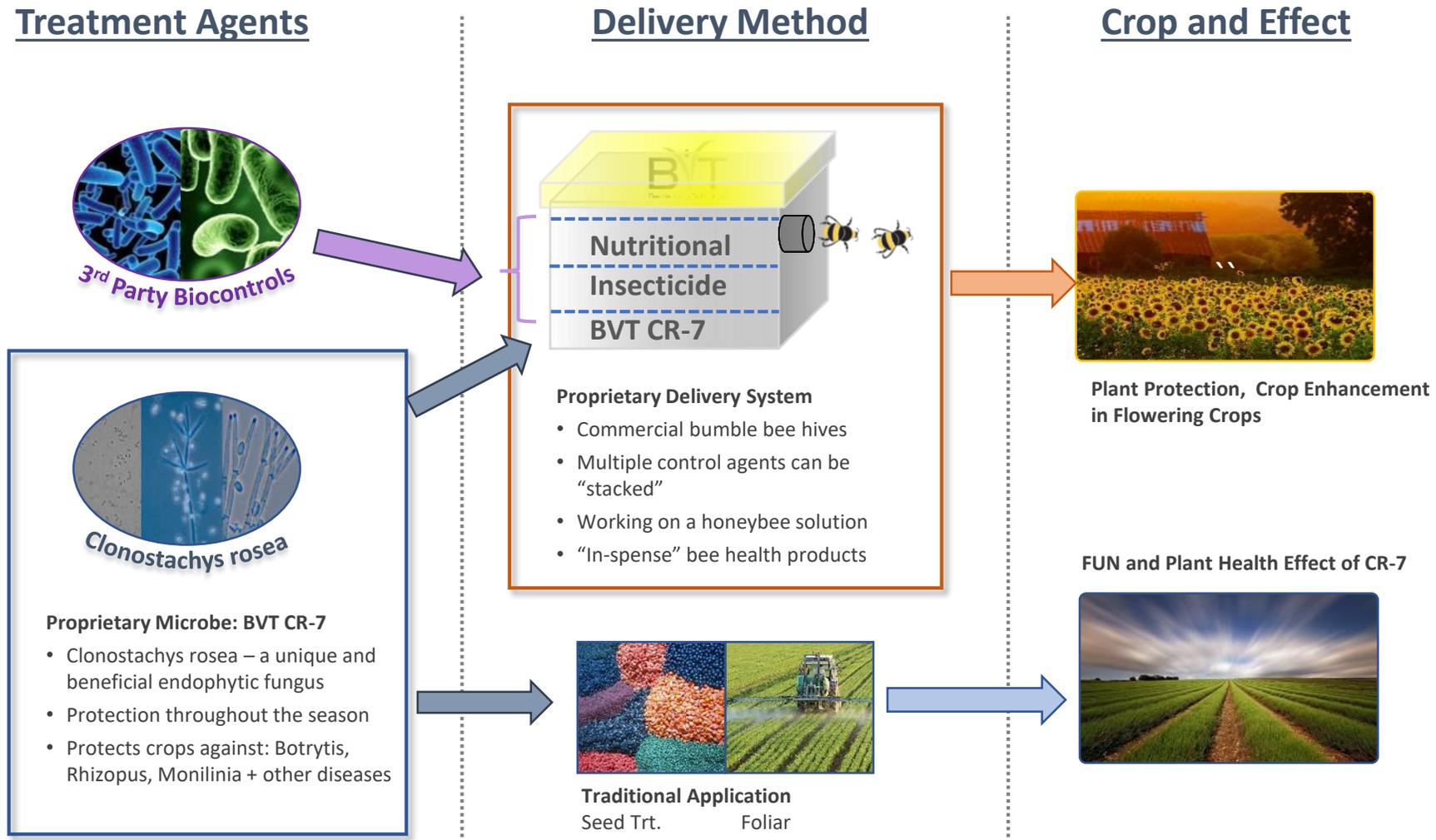


## 2. Bee Vectoring: Simple and Effective with a Tray

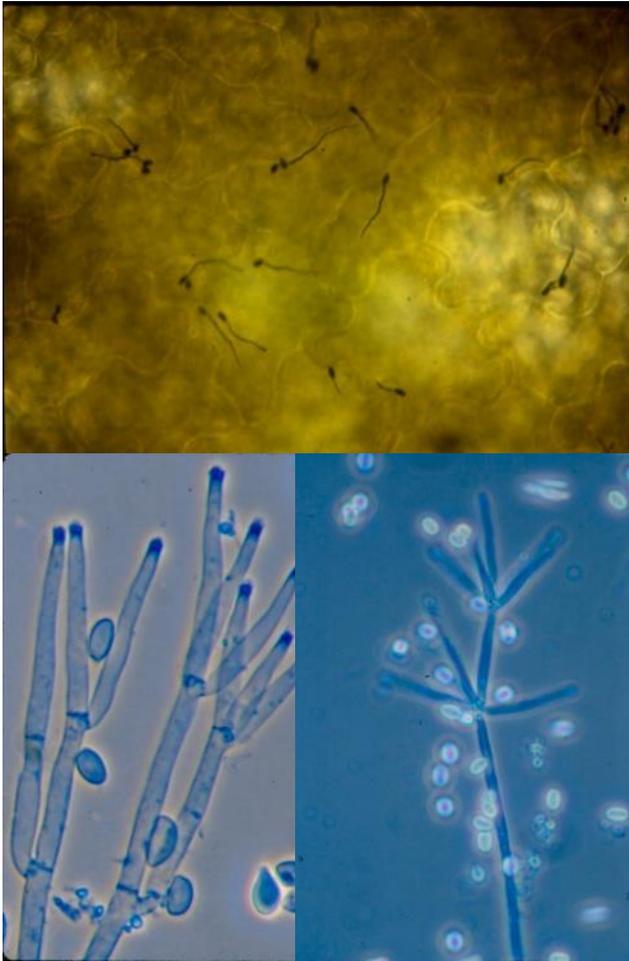
1. Commercially reared bumble bees enter their hive
2. The bees walk across the proprietary VECTORPAK™ tray which is filled with BVT's patented VECTORITE™ -- an *organic* carrier agent which bonds with *stacked* bio-controls (microbes) and attaches safely to the pollinating bumble bees
3. The bees fly to the crops and deliver the beneficial microbe in an efficient way



# 2. Bee Vectoring: BVT Technology



# 3. *Clonostachys rosea* as a Tool for Disease Control



- ❖ BVT CR-7: A unique and beneficial endophytic fungus
- ❖ Where it is found
  - ❖ Sub-arctic to humid tropics, found in numerous soils (agricultural, forest, natural, salt marshes)
  - ❖ Associates with an extraordinarily wide array of plant species.
- ❖ BVT CR-7 was selected from 1400 fungal isolates for
  - ❖ Rapid reproduction, stability in the field, spore size and commercialization
- ❖ BVT CR-7 's characteristics
  - ❖ Remains protected while inside the tissue throughout the growing season
  - ❖ Rapidly colonizes senescing plant tissues to outcompete other diseases and pathogens

*C. rosea* is effective against the following diseases:

- Botrytis – Gray Mold
- Sclerotinia- white mold
- Monilinia- brown rot
- Rhizopus- red leak
- Alternaria- early blight
- Phomopsis
- Anthracnose

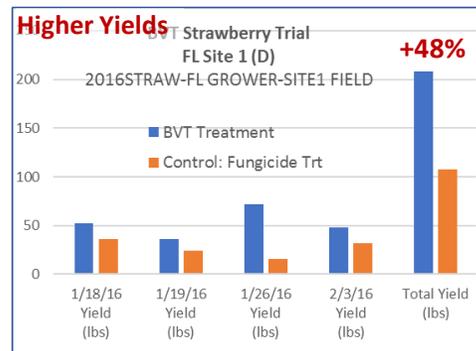
And many more...

# 4. Performance of BVT System: Successful R&D Trials

## Strawberries

40% better control of Botrytis than standard FUN program

30% higher marketable yield



## Sunflowers

8% increase in yield

36% reduction in sclerotinia incidence



Biologicals



Bee Vectoring



## Tomatoes

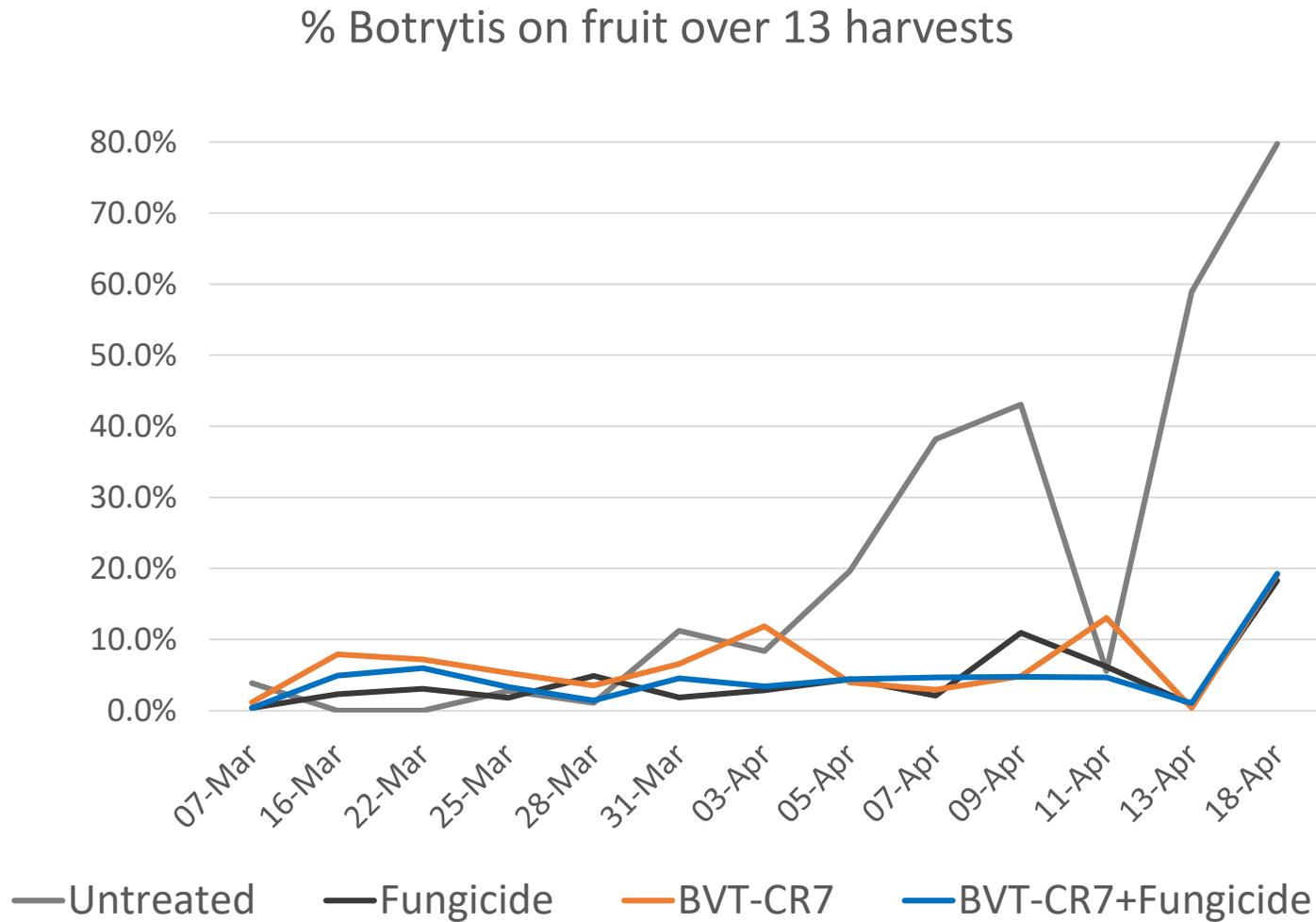
“proof of concept” trials show reduced botrytis

## Blueberries

“proof of concept” trials show reduced Monilinia and higher yields



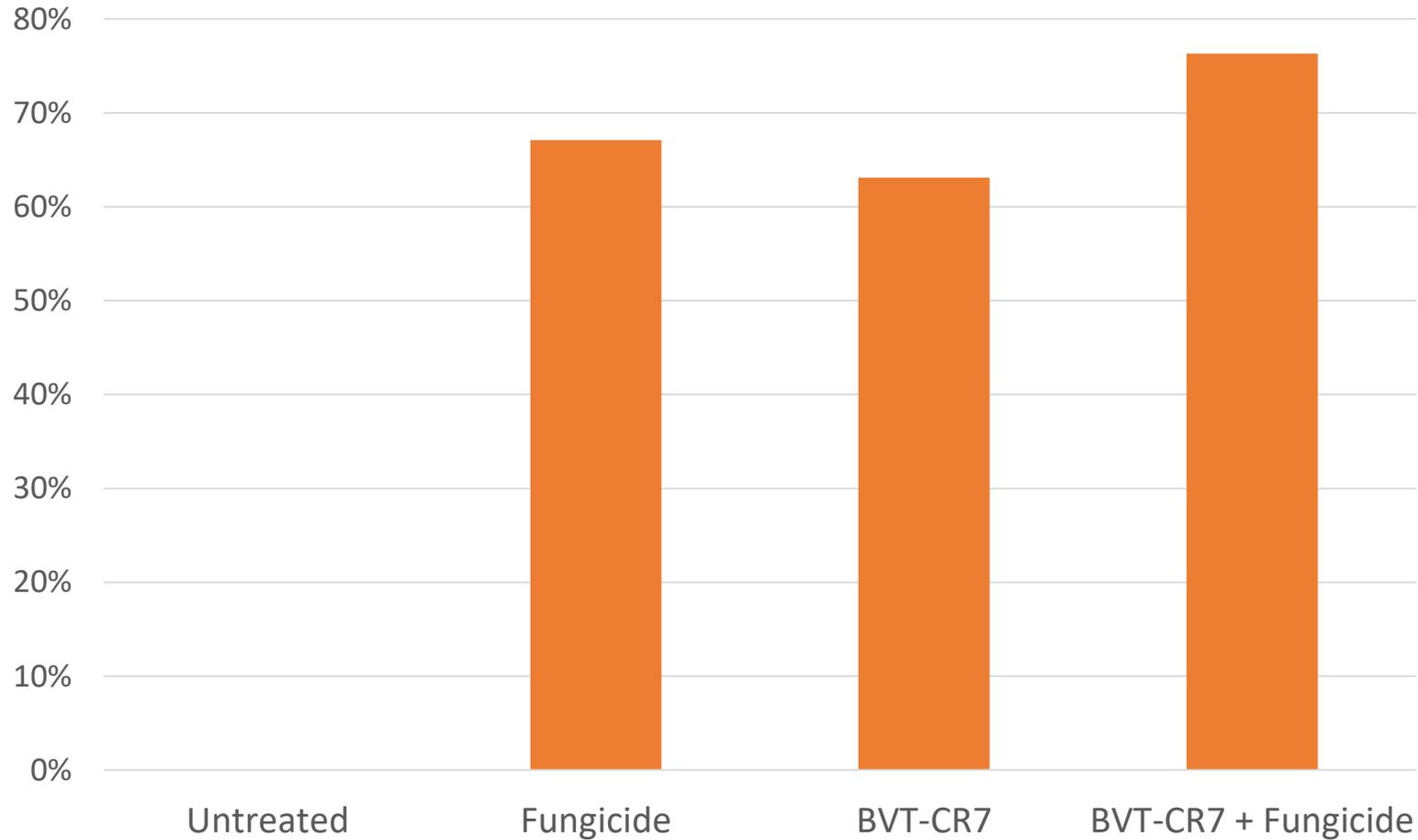
# 4 Performance of the BVT System: Excellent Control of Botrytis





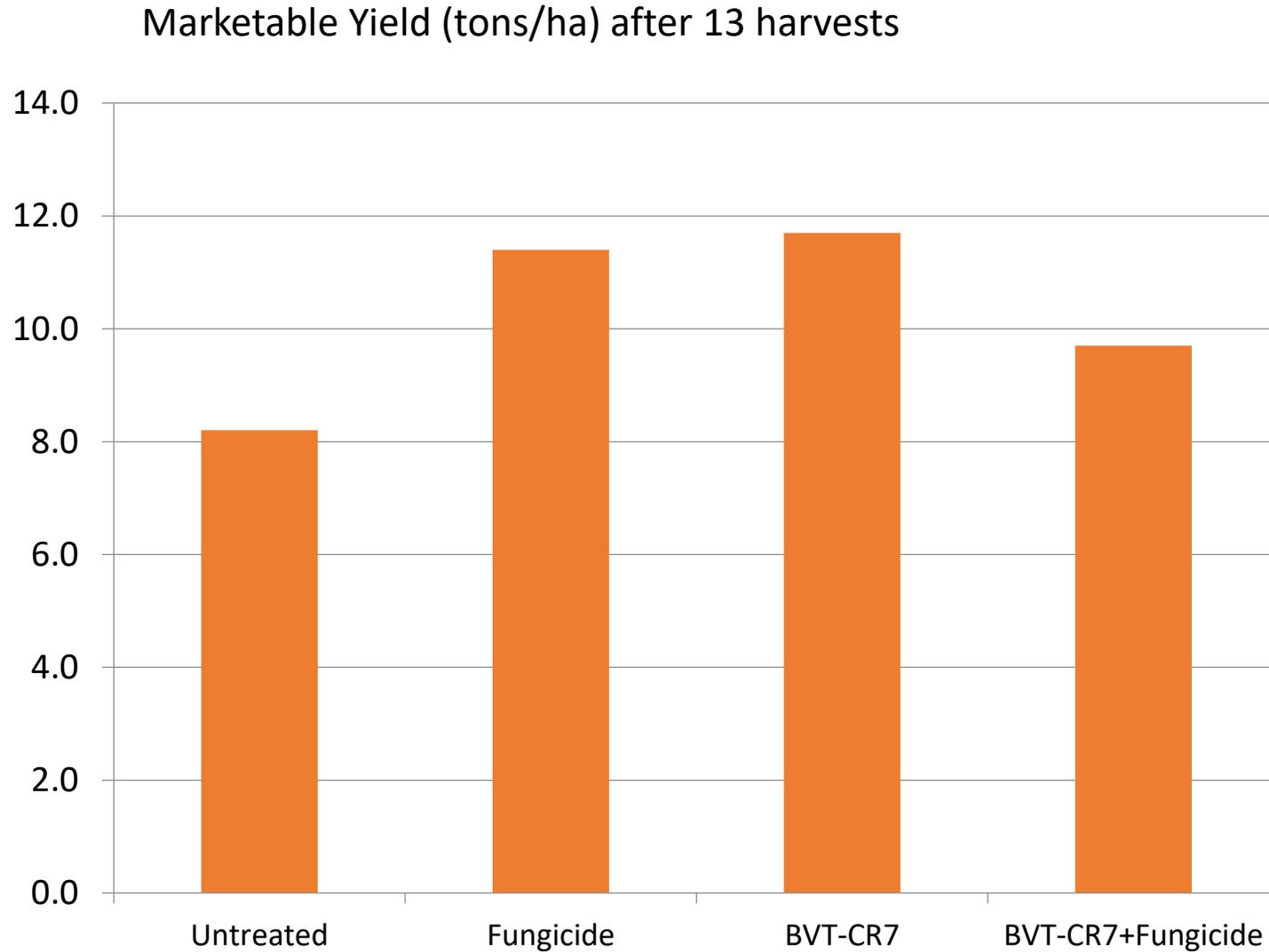
## 4. Performance of BVT System: Excellent control of Botrytis in storage

Fig.5: % Efficacy against Botrytis on stored fruit (overall)





## 4. Performance of BVT System: Enhancement of marketable yield



# 4. Performance of BVT System: Excellent Results in Demonstration Trials

## Results:

1. BVT system produced **better yields (up to +29%)** than fungicide only
2. Yields were better whether there was Botrytis **disease incidence or not**
3. Plot with **“BVT together with only 50% fungicide” produced highest yields** in demo where this was tested

## 40 acres @ Jaymar Farms

3 plots: (1) FUN-only; (2) BVT+ FUN; (3) BVT + 50% FUN



- (2) and (3) had better control of Botrytis (3% incidence vs 13%)
- (3) had highest marketable yield +26% vs. (1)
- (2) had +6% higher marketable yield vs (1)

## 20 acres

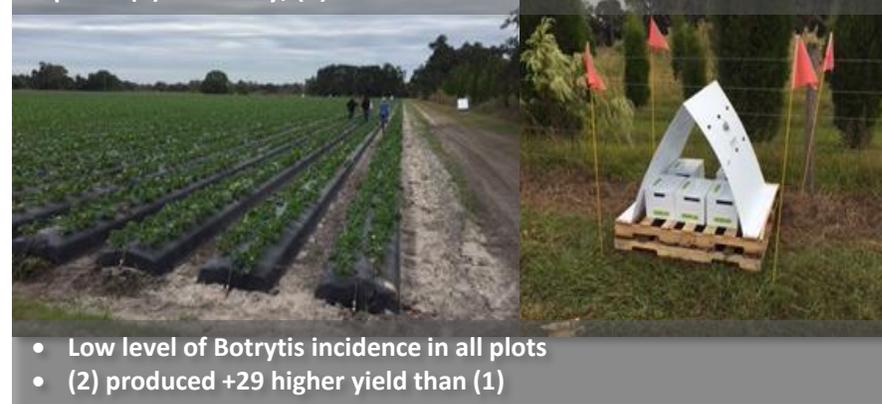
3 plots: (1) FUN-only; (2) BVT+ FUN; (3) BVT + FUN



- Low level of botrytis incidence in all plots
- (2) and (3) produced +6 and +24% higher yield than (1)
- Plants in (2) and (3) averaged 11% more berries per plant than (1)

## 10 acres

2 plots: (1) FUN-only; (2) BVT+ FUN



- Low level of Botrytis incidence in all plots
- (2) produced +29% higher yield than (1)

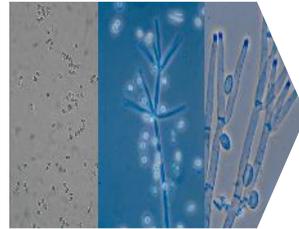
# 5. Summary

## Conclusions from the trials:

- Bumble bees successfully and consistently deliver BVT-CR7
- BVT-CR7 consistently performed as effectively as the fungicide standard against fruit rot (Botrytis) in the field and in storage (improved shelf life)
- BVT-CR7 enhanced yield by **14 - 42%** compared to untreated, and by **3 – 15%** compared to the standard fungicide treatment

### Biopesticides:

#### *An Alternative to Chemicals*



Low toxicity  
Highly targeted  
Lower exposure  
Nature at work

\$3 Billion  
12%  
16% CAGR

Market Size  
Projected growth  
2009 - 2015

### Bee Vectoring:

#### *An Alternative to Spraying*



Highly targeted  
Less water  
Less waste  
Less machinery

115 Crops Worldwide  
87 Require pollination  
80 M Commercial beehives

# Thanks / Contact Details for Questions

- ✓ Bumble bees effectively deliver bioagents to the flowers
- ✓ The BVT System is a sustainable crop production tool
  - ✓ Proven to manage Botrytis and improve shelf life; increase yields; enhance crops
- ✓ Proprietary system – simple and effective
  - ✓ Platform that is scalable

## Contact Info

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