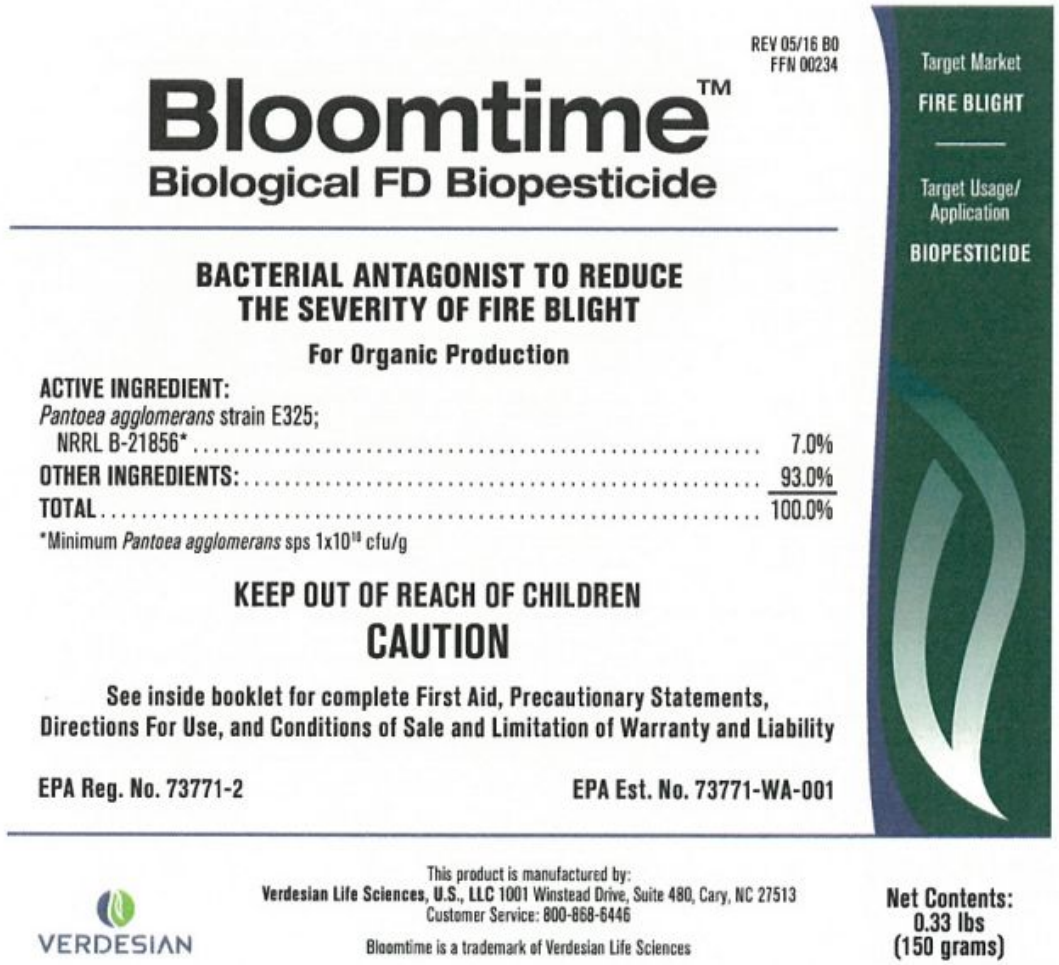
Fire Blight Control: Reenvisioning Bloomtime *LIVE*

Jane Fife, Ph.D.
Chief Technical Officer, 3Bar Bio
janefife@3barbiologics.com

IR-4
2025 Industry Technology Session
February 20, 2025

Original Bloomtime™ Biopestide Product


REV 05/16 B0
FFN 00234

Bloomtime™
Biological FD Biopesticide

BACTERIAL ANTAGONIST TO REDUCE THE SEVERITY OF FIRE BLIGHT

For Organic Production

ACTIVE INGREDIENT:
Pantoea agglomerans strain E325;
NRRL B-21856* 7.0%
OTHER INGREDIENTS: 93.0%
TOTAL 100.0%
*Minimum *Pantoea agglomerans* sps 1x10[13] cfu/g

KEEP OUT OF REACH OF CHILDREN

CAUTION

See inside booklet for complete First Aid, Precautionary Statements, Directions For Use, and Conditions of Sale and Limitation of Warranty and Liability

EPA Reg. No. 73771-2

EPA Est. No. 73771-WA-001

Target Market
FIRE BLIGHT

Target Usage/ Application
BIOPESTICIDE

VERDESIAN

This product is manufactured by:
Verdesian Life Sciences, U.S., LLC 1001 Winstead Drive, Suite 480, Cary, NC 27513
Customer Service: 800-868-6446
Bloomtime is a trademark of Verdesian Life Sciences

Net Contents:
0.33 lbs
(150 grams)

- Active ingredient: *Pantoea agglomerans* strain E325 NRRL B-21856
- Storage -20°C to 4°C
- Wettable Powder (WP) formulation mixed with water
- Application rate: 150 g / acre in 100-200 gal of water per acre
  - Three applications: early bloom, full bloom, post petal fall

How does *Pantoea agglomerans* strain E325 work?

- *P. agglomerans* E325 is an **excellent colonizer of stigmatic tissue** on apple and pear blossoms (Pusey 2002; Pusey and Curry 2004)
- Provides biocontrol mechanisms of **competitive exclusion and habitat modification** (Johnson and Stockwell 2000).
- *P. agglomerans* E325 has **high specificity to *Erwinia amylovora*** (Pusey et al 2008a).
- *P. agglomerans* E325 produces **antibiotic compounds**
  - Acidification of the stigma habitat favors stability and activity of the antibiotic for optimal suppression of *E. amylovora* (Pusey et al 2011).

P. agglomerans colony

Fi
ap

Journal of Applied Microbiology 2000, **89**, 793–800

Effect of protective agents, rehydration media and initial cell concentration on viability of *Pantoea agglomerans* strain CPA-2 subjected to freeze-drying

E. Costa, J. Usall, N. Teixidó, N. Garcia and I. Viñas
Postharvest Unit, CeRTA, Centre UdL-IRTA, Lleida, Spain

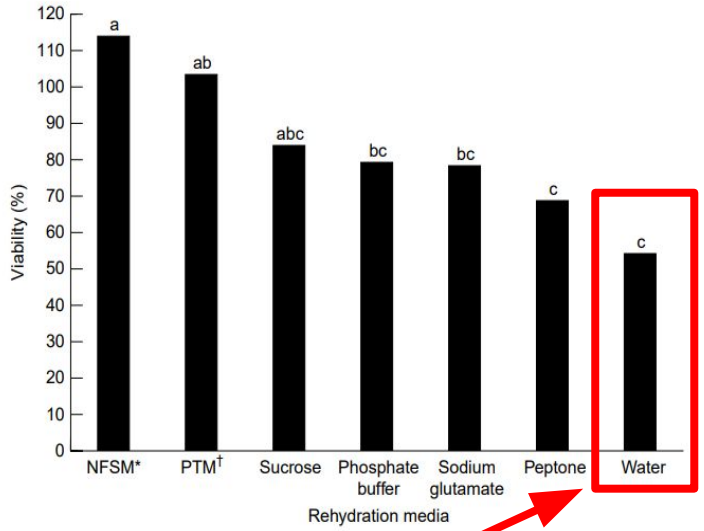


Fig. 2 Effect of rehydration media on the viability of *Pantoea agglomerans* CPA-2 cells freeze-dried in 10% sucrose as protective agent. The separation of means was conducted according Duncan's Multiple Range Test. Columns with different letters indicate significant

Rehydration in water lowers viability by >50%

- Alternative "revitalization" medias (eg, skim milk, peptone/tryptone, sucrose) better

Journal of Applied Microbiology 2000, 89, 793–800

Effect of protective agents, rehydration media and initial cell concentration on viability of *Pantoea agglomerans* strain CPA-2 subjected to freeze-drying

E. Costa, J. Usall, N. Teixidó, N. Garcia and I. Viñas
Postharvest Unit, CeRTA, Centre UdL-IRTA, Lleida, Spain

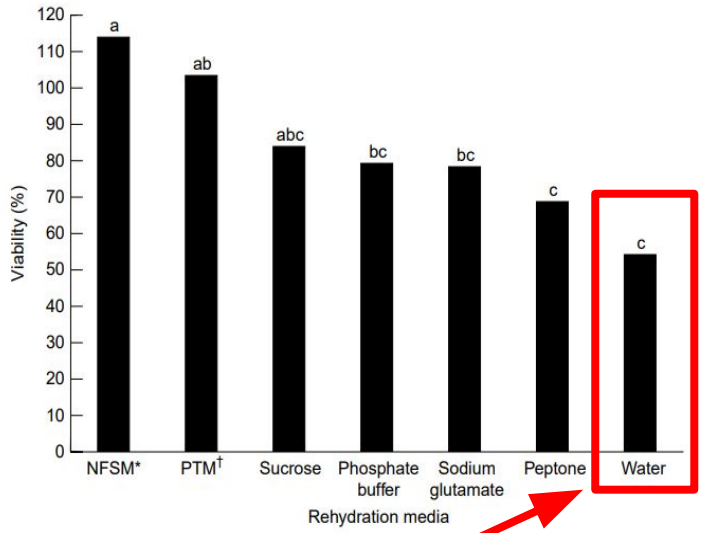


Fig. 2 Effect of rehydration media on the viability of *Pantoea agglomerans* CPA-2 cells freeze-dried in 10% sucrose as protective agent. The separation of means was conducted according Duncan's Multiple Range Test. Columns with different letters indicate significant

Rehydration in water lowers viability by >50%

- Alternative "revitalization" medias (eg, skim milk, peptone/tryptone, sucrose) better

Journal of Food Protection, Vol. 64, No. 6, 2001, Pages 856–861

Viability, Efficacy, and Storage Stability of Freeze-Dried Biocontrol Agent *Candida sake* Using Different Protective and Rehydration Media

M. ABADIAS,* N. TEIXIDÓ, J. USALL, A. BENABARRE, AND I. VIÑAS

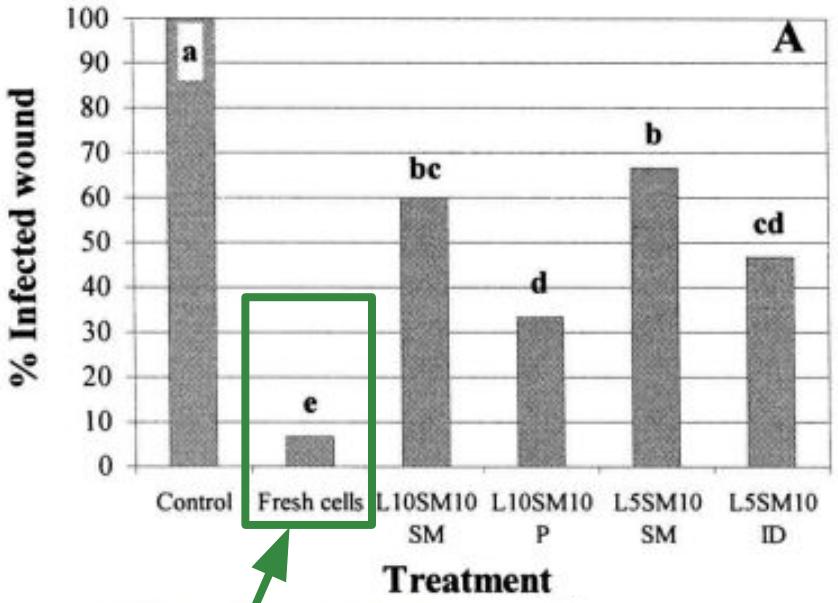


FIGURE 1. *Efficacy of the freeze-dried* C. sake *treatments com-*
pared with fresh cells in reducing the development of P. exp

Efficacy of fresh cells significan
than rehydrated cells (even wit
rehydration medias)

Journal of Applied Microbiology 2000, 89, 793–800

Effect of protective agents, rehydration media and initial cell concentration on viability of *Pantoea agglomerans* strain CPA-2 subjected to freeze-drying

E. Costa, J. Usall, N. Teixidó, N. Garc
Postharvest Unit, CeRTA, Centre UdL-IRTA, Lle

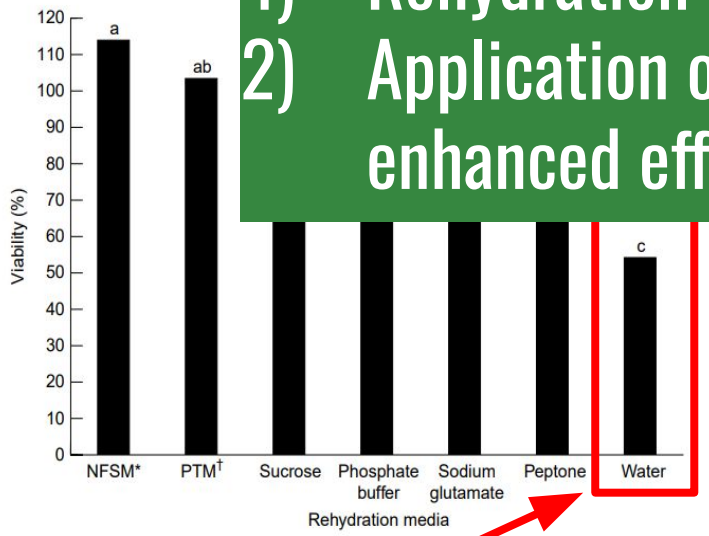


Fig. 2 Effect of rehydration media on the viability of *Pantoea agglomerans* CPA-2 cells freeze-dried in 10% sucrose as protective agent. The separation of means was conducted according Duncan's Multiple Range Test. Columns with different letters indicate significant

Journal of Food Protection, Vol. 64, No. 6, 2001, Pages 856–861

Viability, Efficacy, and Storage Stability of Freeze-Dried Biocontrol Agent *Candida sake* Using Different Protective and Rehydration Media

EIXIDÓ, J. USALL, A. BENABARRE, AND I. VIÑAS

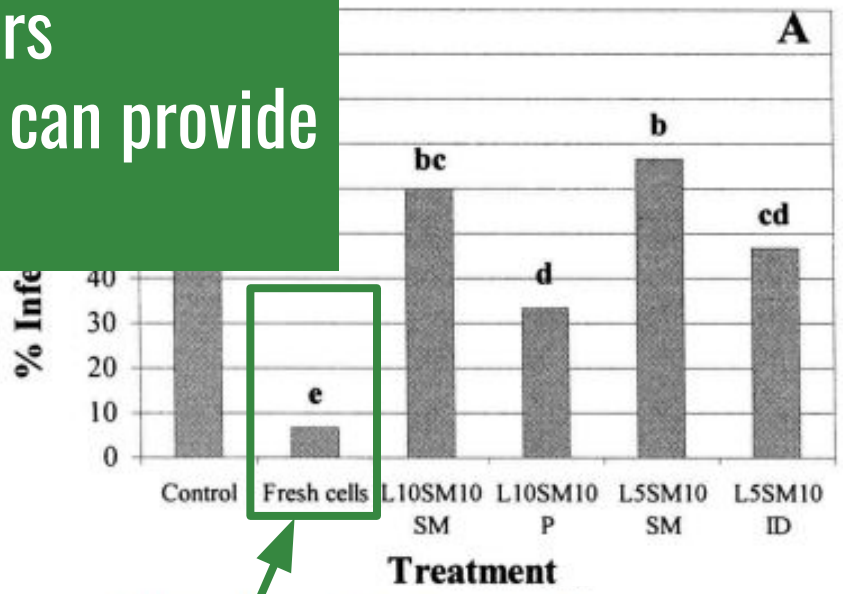


FIGURE 1. *Efficacy of the freeze-dried* C. sake *treatments com-*
pared with fresh cells in reducing the development of P. exp

KEY TAKEAWAYS

1) Rehydration media matters
2) Application of fresh cells can provide enhanced efficacy

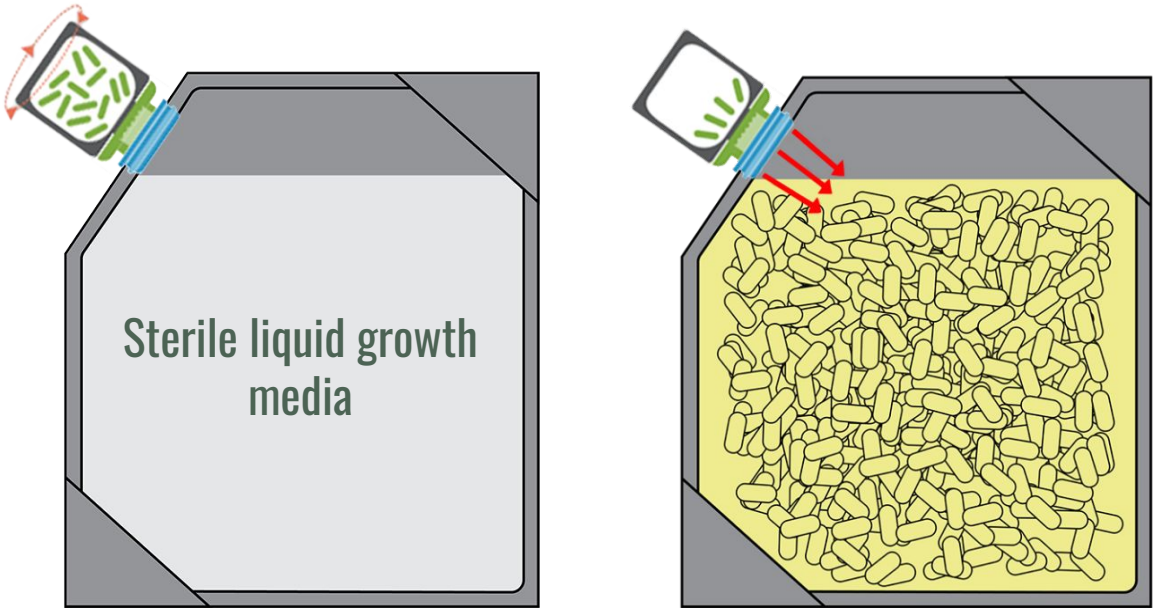
Rehydration in water lowers viability by >50%

- Alternative "revitalization" medias (eg, skim milk, peptone/tryptone, sucrose) better

Efficacy of fresh cells significan
than rehydrated cells (even wit
rehydration medias)

Innovative Fermentation Delivery System

Livemicrobe®



Before Activation
Freeze-dried bacteria in cap

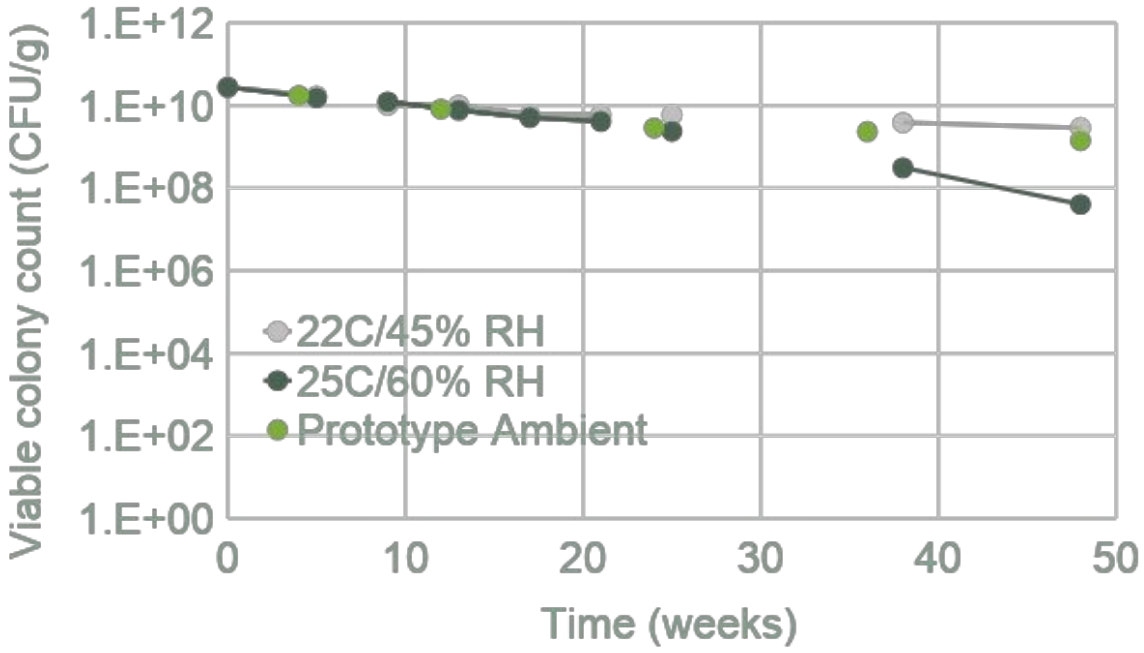
After Fermentation
Bacterial cells grow to high concentration 24-48 hrs

- **Freshly fermented cells** grown in contained package
- **Avoids osmotic shock** of dried cells when rehydrated in water
- **No refrigeration** or special handling
- **Shelf life > 12 months**
- **Small amount of freeze-dried bacterial powder** (0.1 g/acre) in LiveMi
  compared to 150 g/acre WP

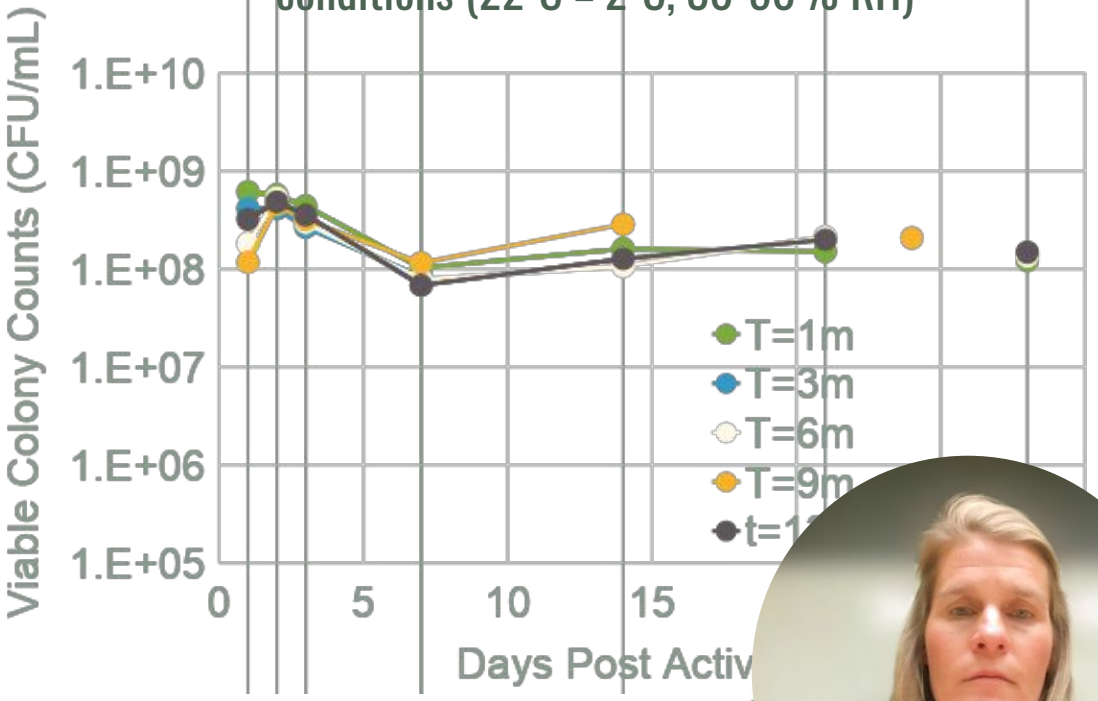
Freeze-dried microbes stored in cap

Product Stability

Freeze-dried stability of ***Pantoea agglomerans*** **E325** stored in caps and LiveMicrobe prototype units

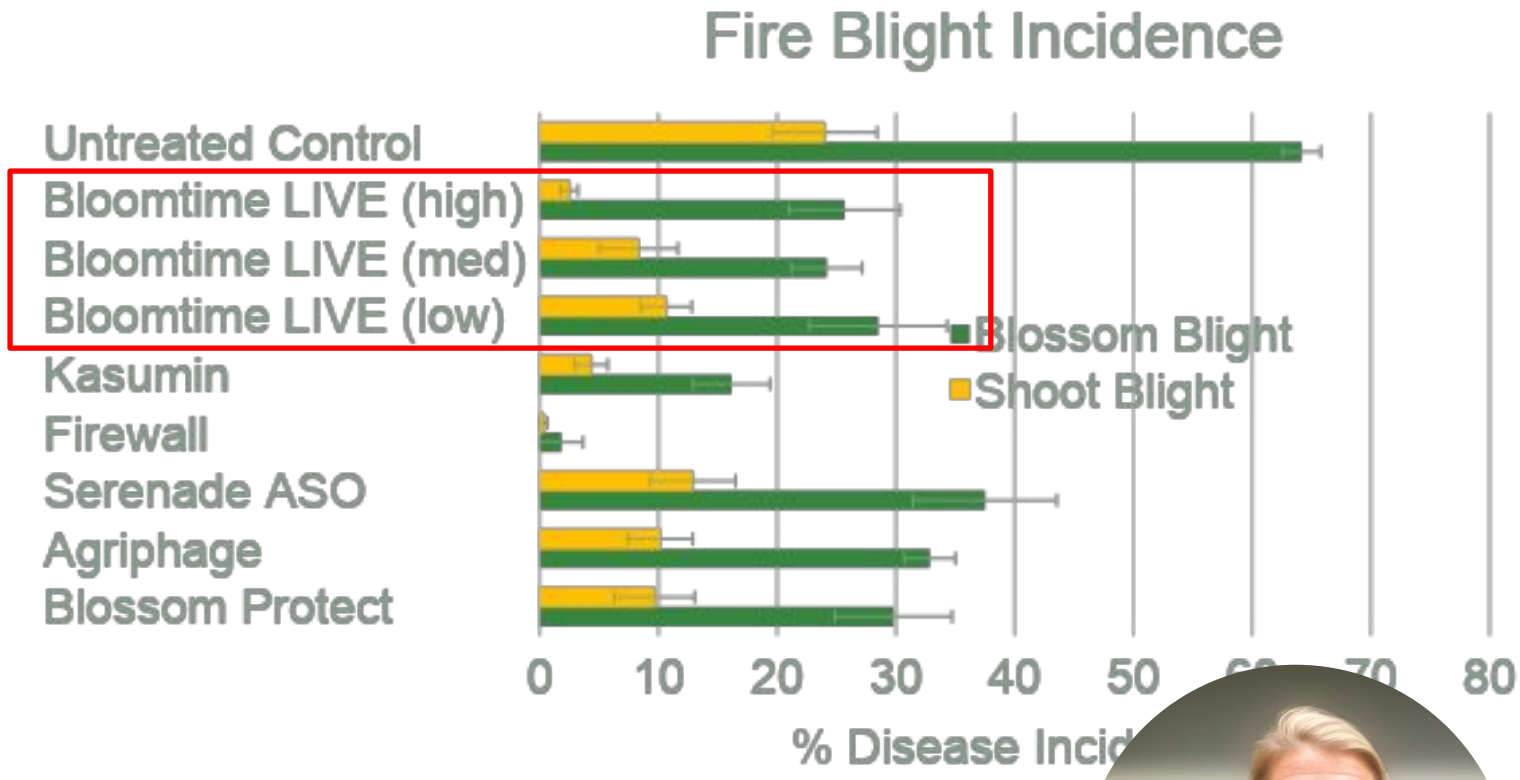


Growth kinetics of ***Pantoea agglomerans*** **E325** in LiveMicrobe prototype units stored under ambient lab conditions (22ºC ± 2ºC, 30-50% RH)



Bloomtime *LIVE* 2023 Field Data

- Michigan apple fire blight trial (n=4)
- Bloomtime LIVE applied 2X:
  70-80% blossom, full bloom (FB)
  - Low (7.4E4 CFU/mL)
  - Med (7.4E5 CFU/mL)
  - High (7.4E6 CFU/mL)
- All other treatments applied 3X:
  70-80% blossom, FB, FB+3-4 days



RESULTS: Bloomtime *LIVE* performed as good or better than organic standard with only two applications (compared to 3 applications for all other products)

THANK YOU!

3BarBio

THE AGBIO CDMO

Jane Fife, Ph.D.
Chief Technical Officer, 3Bar Bio
janefife@3barbiologics.com