

TACKLING THE RE-EMERGENCE OF CRANBERRY FALSE BLOSSOM DISEASE

Lindsay Wells-Hansen, Ph.D.

**Sr. Agricultural Scientist, Ocean Spray Cranberries
New Jersey, USA**



WHAT WE'LL COVER TODAY

- Cranberry False Blossom Disease: the basics
- Current Management Strategies:
 - Manage the insect vector (blunt-nosed leafhoppers)
 - Establish beds with clean plant material
 - Destroy/remove infected plants
- What can you do *right now*, and what research is underway?



CRANBERRY FALSE BLOSSOM DISEASE- *the pathogen*

- Caused by a phytoplasma → bacterium lacking a cell wall
- Lives in the phloem of infected plants
 - Insect vectors need to feed on phloem to acquire and transmit the disease
- Requires living tissue to survive and multiply
 - Cannot be cultured → more difficult to study in lab

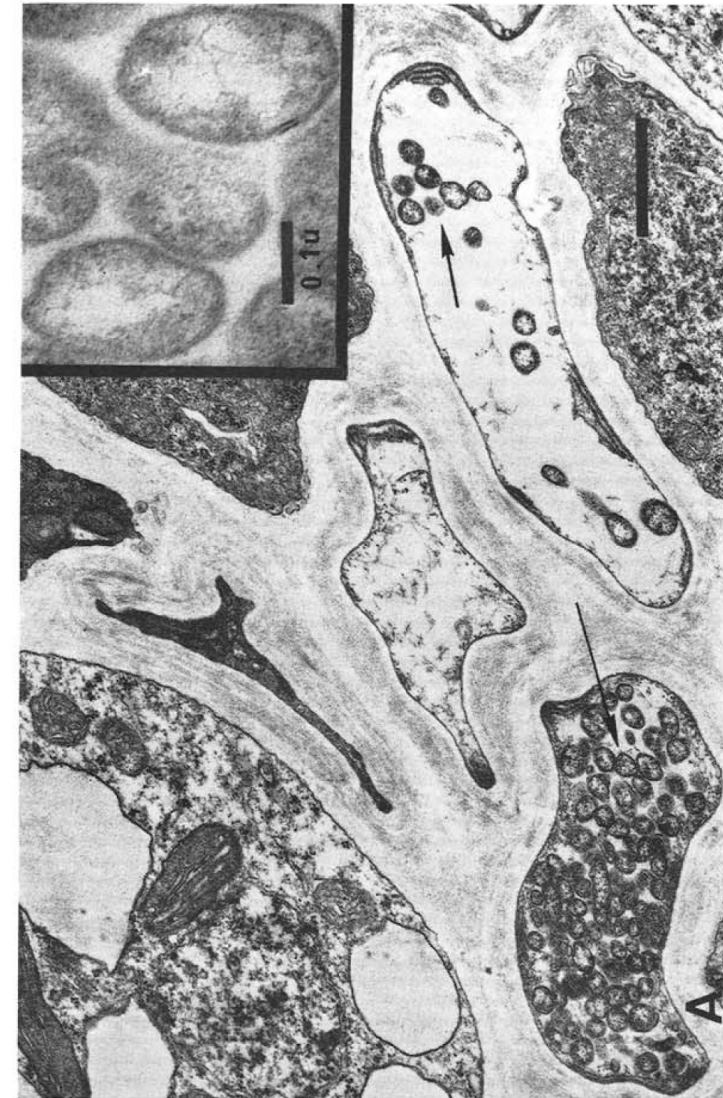


Photo credit: T.A. Chen, *Phytopathology* 1971

CRANBERRY FALSE BLOSSOM DISEASE- *the basics*

- Devastating disease in NJ, MA and WI in early 1900s
- ‘Eliminated’ from industry in mid-1900s by:
 - Managing the blunt-nosed leafhopper vector with insecticides
 - Release and planting of ‘resistant’ varieties (e.g., ‘Stevens’)
- Re-emerged in NJ in 1990s
- Currently confirmed as present in NJ, MA, and WI



CRANBERRY FALSE BLOSSOM DISEASE- *re-emergence*

Massachusetts

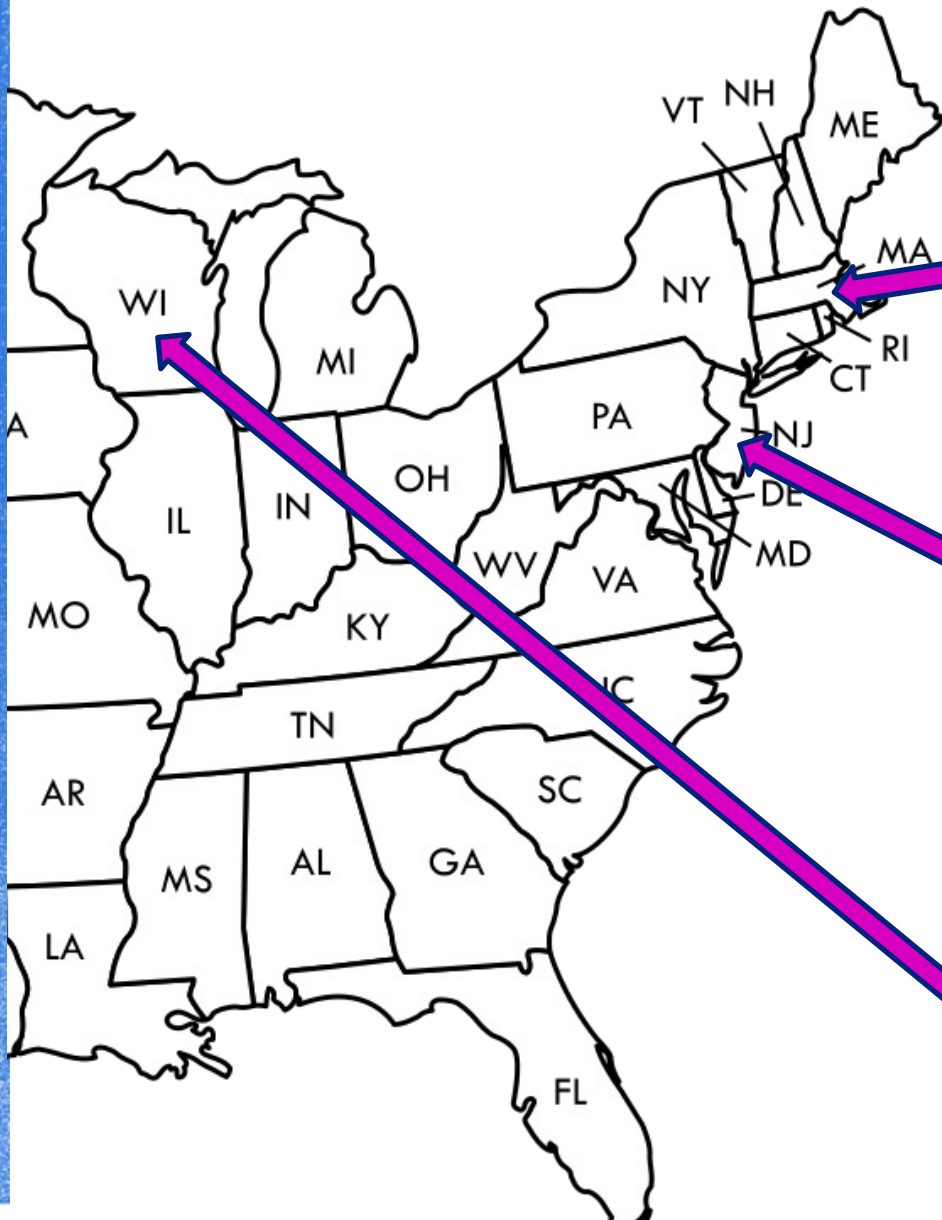
- False blossom pathogen confirmed at a few locations in 2017

New Jersey

- False blossom disease symptoms showed up in 1990s
- Pathogen was confirmed several years later

Wisconsin

- False blossom pathogen confirmed in 2018



CRANBERRY FALSE BLOSSOM DISEASE- *the basics*

- Infected vines **do not** produce fruit
- Infected vines remain infected → **do not** recover
- Infected vines are a source of inoculum for further spread
- Symptoms appear 1 month to 1 year after infection
- Transmitted/spread by the blunt-nosed leafhopper (BNLH)
 - Dodder
 - Infected Plant Material



CRANBERRY FALSE BLOSSOM DISEASE- *symptoms*

- Distorted, bright pink flowers
- Erect pedicels
- Berries are misshapen and small *if* formed
- Pistils are retained



CRANBERRY FALSE BLOSSOM DISEASE- *symptoms*

- Distorted, bright pink flowers
- Erect pedicels
- Witches' brooming → clusters of uprights formed



CRANBERRY FALSE BLOSSOM DISEASE- *symptoms*

- Leaves on infected plants are smaller in size
- Infected plants remain red longer in the spring & turn red earlier in the fall



CRANBERRY FALSE BLOSSOM DISEASE- *transmission*

- Blunt-nosed leafhopper (BNLH)
- Infected Plant Material
- Dodder
- **Not** known to be mechanically spread (e.g., by equipment)



BLUNT-NOSED LEAFHOPPERS- *the basics*

- One generation per year
- Overwinter as eggs
- Eggs Hatch & Nymphs (5 stages) ~ mid-May in NJ/MA/WI (and likely EC)
- Adults primarily present ~end of June through end of July



BLUNT-NOSED LEAFHOPPERS- *management*

- Pre-bloom insecticide application targeting nymphs
- Post-bloom insecticide application targeting adults *if necessary*
- No true established threshold



BLUNT-NOSED LEAFHOPPERS- *management*

- No true established threshold, but we're currently using:
- Average ~20 BNLH per sweep set in young beds and/or beds with false blossom disease
- Average ~40 BNLH per sweep set in older beds and/or beds without false blossom disease



BLUNT-NOSED LEAFHOPPERS- *management*

- Treat nymphs (pre-bloom) rather than adults whenever possible
- Organophosphates (e.g., Malathion, Orthene)
- Carbamates (e.g., Sevin)
- Neonicotinoids (e.g., Actara) – should **not** be applied pre-bloom
- Pyrethroids (e.g., Danitol, Fanfare) – effective if they become available to you



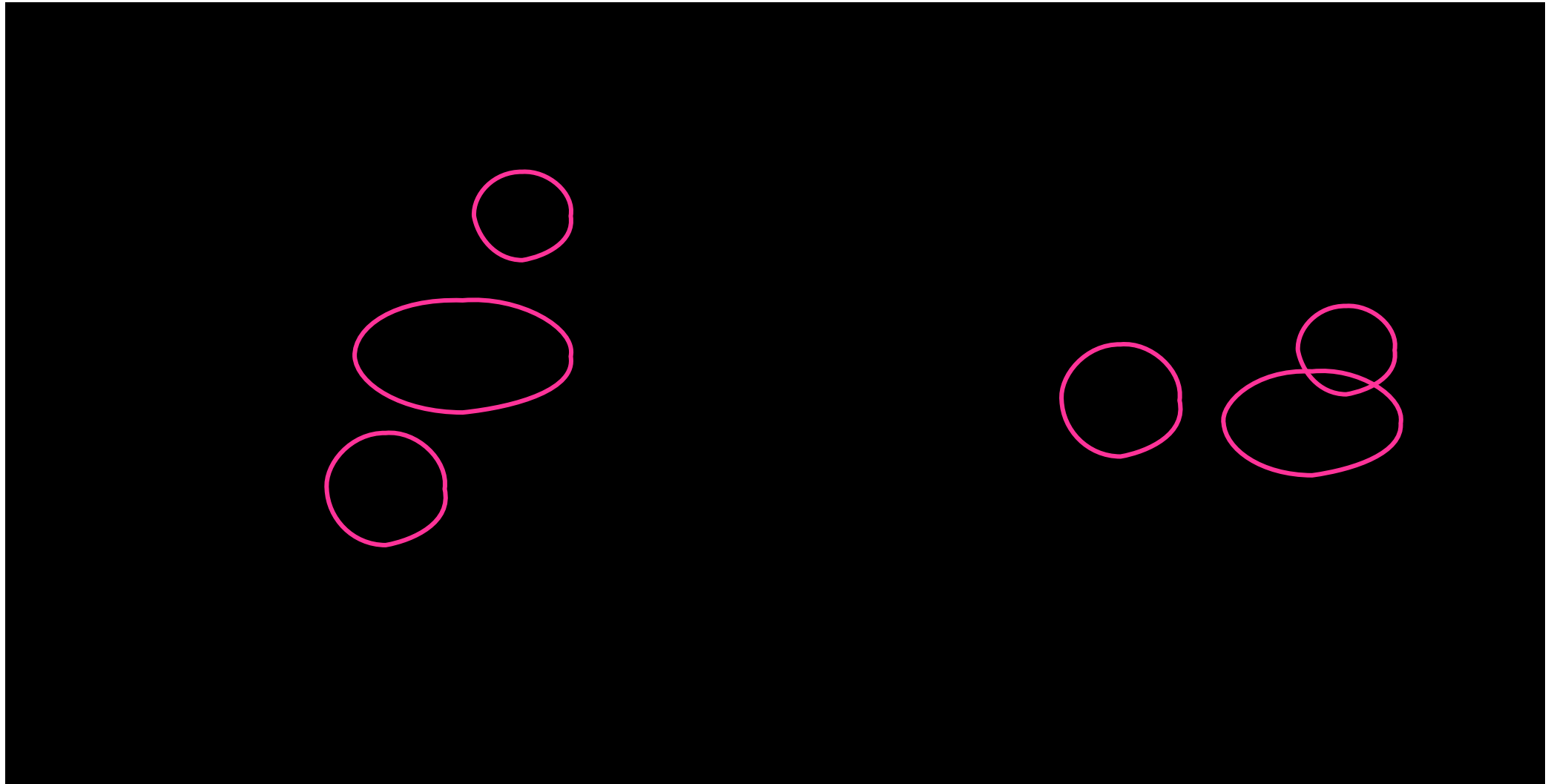
MANAGEMENT STRATEGIES—*destroy/remove infected plants*

- Wipe with a glyphosate product
- Hand-removal → must remove ENTIRE plant
- Flame treatment? → experiments underway
- Electric weeder? (future)



MANAGEMENT STRATEGIES—*destroy/remove infected plants*

- Flame treatment experiments underway
- Evaluating different timings, duration, etc.



CRANBERRY FALSE BLOSSOM DISEASE- *current research*

- The CFBD phytoplasma is present in **all plant parts** throughout the **entire** season (May through November) in symptomatic plants
 - Roots, leaves, flowers, stems, misshapen berries
 - Every upright on a runner is infected → indicates systemic infection
 - This is why the **entire** plant must be removed/destroyed
 - A few asymptomatic uprights have tested positive for CFBD
- New q-PCR assay developed in the Holland Lab (University of Wisconsin) for detection and DNA quantification



CRANBERRY FALSE BLOSSOM DISEASE- *current research*

- Sharp-nosed leafhoppers (commonly found in NJ) can **carry** the false blossom phytoplasma → **no evidence that they transmit false blossom!**



WHAT CAN YOU DO TO...

PREVENT CFBD INFECTION

- Scout and treat for blunt-nosed leafhoppers
- Plant non-infected vines
- Do not mow propagative cuttings from infected/symptomatic beds

MANAGE CFBD INFECTION

- Scout and treat for blunt-nosed leafhoppers
- Scout for symptoms in vines
- Remove infected vines from beds

QUESTIONS?

Lindsay Wells-Hansen, Ph.D.
Sr. Agricultural Scientist, Ocean Spray Cranberries
lwellshansen@oceanspray.com
609-354-8645

