Bacterial Wilt on Blueberry in Florida

2026 Update

FBGA Summer Meetings

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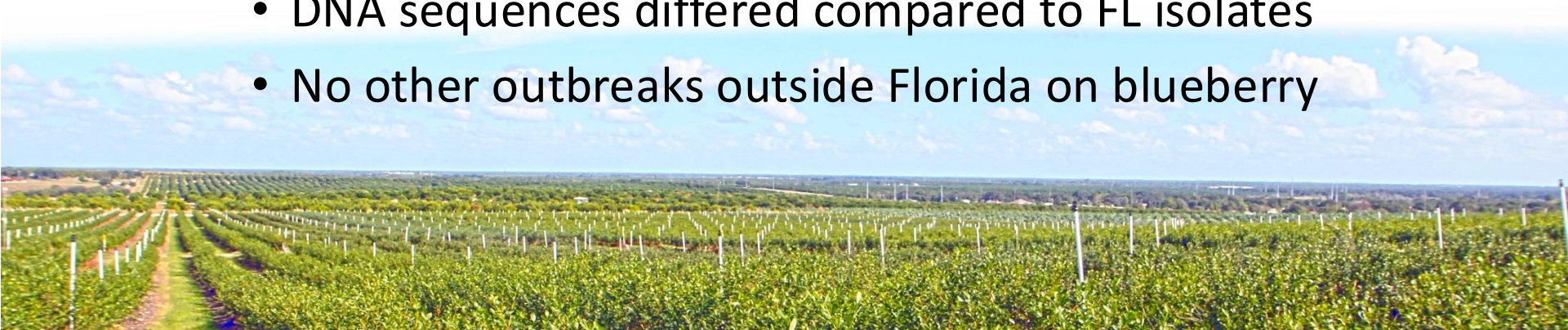
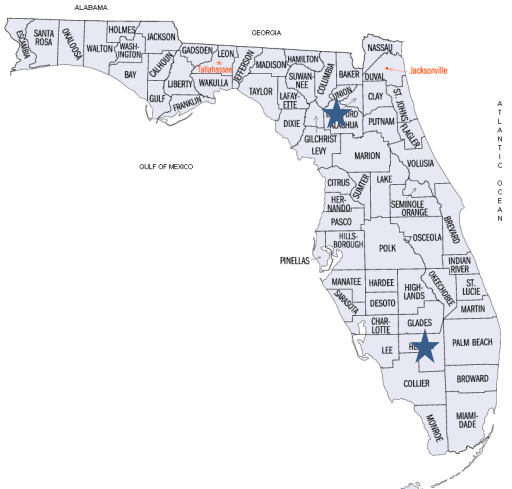
Bacterial Wilt

- Caused by *Ralstonia solanacearum*
  - Soil-borne bacterium with a wide host range
- Previously reported on blueberry only once (in New Jersey 2012)
  - Cultivar Bluetta (NHB) was affected
  - 20 year-old bushes rapidly died
  - Quarantine and eradication efforts ensued
    - DNA sequences differed compared to FL isolates
    - No other outbreaks outside Florida on blueberry



Bacterial Wilt in Florida

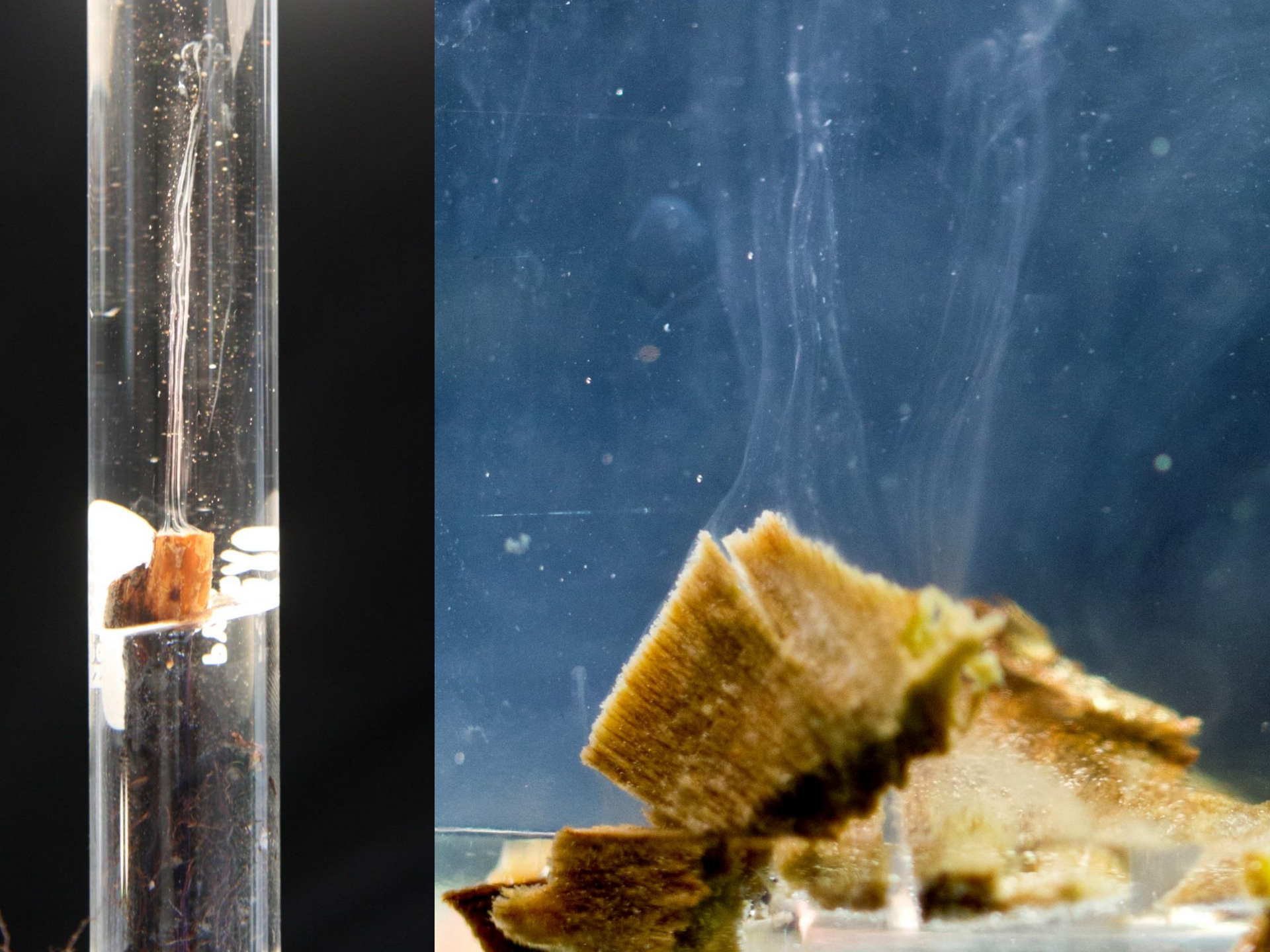
- Found on 5 Florida Blueberry farms in 2016
- As of 2026 Bacterial wilt has been confirmed on more than a dozen farms in 12 Florida Counties
- Distribution on farms is spotty and Arcadia is the most severely affected UF variety
  - Arcadia, Avanti, Kestrel, Meadowlark, Indigocrisp, Myra, Binda, Magica, Albus, Farthing, Sentinel, and several selections
- Isolates from blueberry farms ranging from Alachua Co. to Hendry Co. vary genetically, but all have tested negative for Race 3 biovar 2

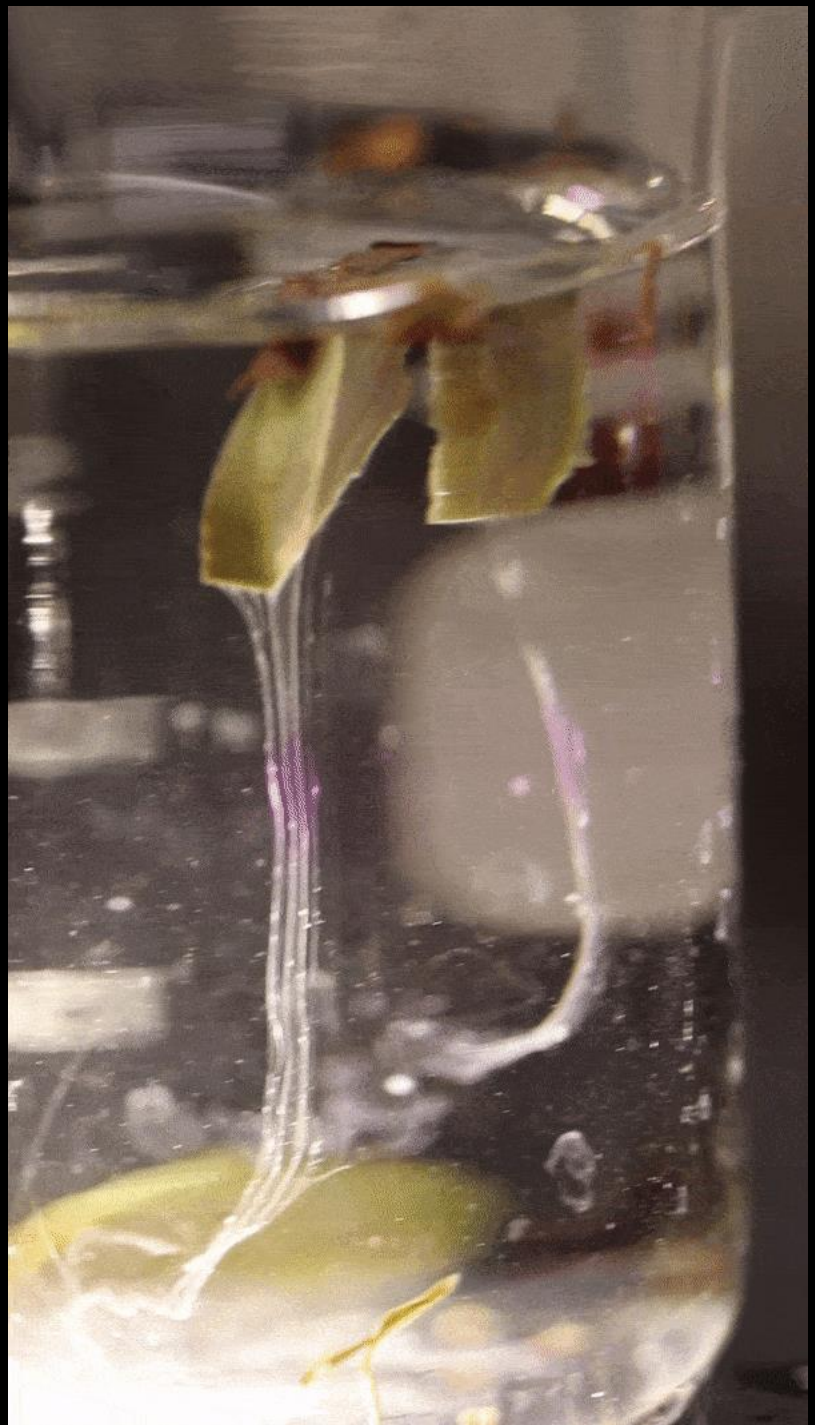


Symptoms

- Similar to bacterial leaf scorch (Xylella)
- Drought stress: marginal scorching of leaves, dieback, stem blight, plant death
- symptoms move down the row more rapidly than across
- Xylem of plants loaded with bacterial ooze clogging vasculature


2



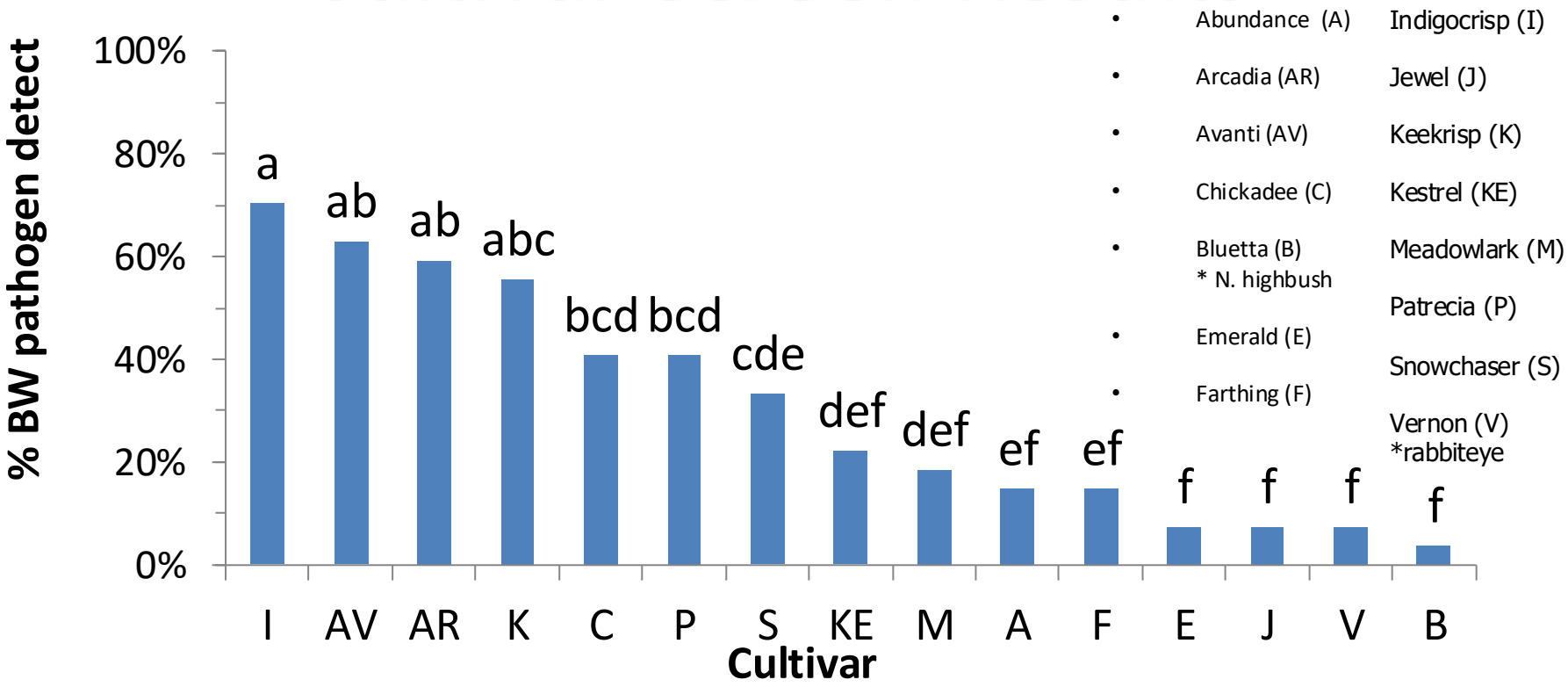



STIHL

Variety specific?

- UF research has shown all tested highbush varieties including Bluetta are susceptible under high inoculum and conducive conditions, as is *V. arboreum, darowii, elliottii*, cranberry and rabbiteye

Cultivar Screen Results



- Every cultivar was susceptible, but frequency of disease detection varied significantly among cultivars, and Arcadia was in the most susceptible statistical grouping.
- Mean time to permanent wilt was not a reliable indicator of susceptibility.
- Results from this assay are consistent with other cultivar screens, data from diagnostic clinics, and observations of disease in the field, and would be useful for selecting less susceptible varieties in breeding programs.

Continued spread

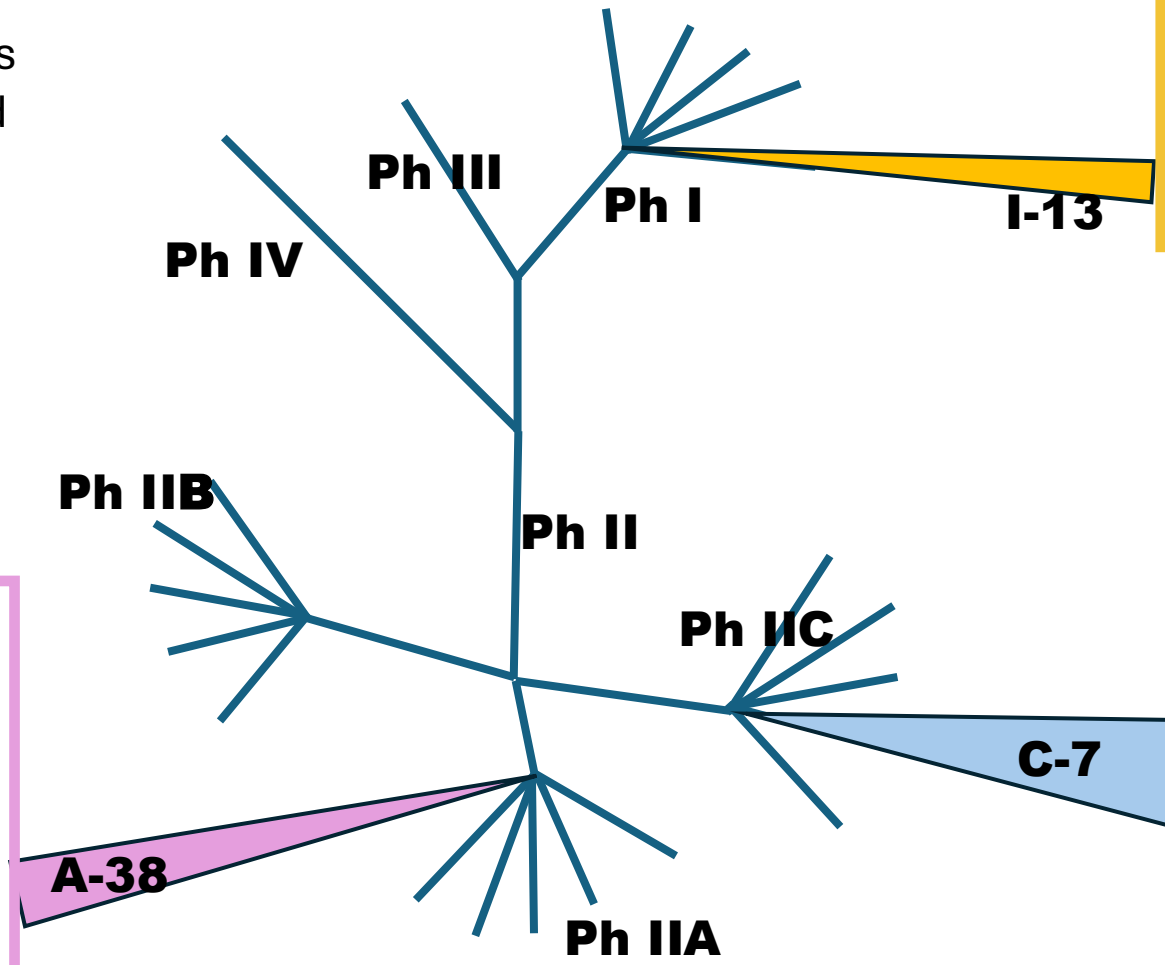
- **Oliver, J.E., Lewis, K.J., Post, K., Taylor, S., and Jogi, A.** (2023). First Report of Bacterial Wilt Disease Caused by Ralstonia solanacearum on Southern Highbush Blueberries (Vaccinium corymbosum Interspecific Hybrids) in Georgia, USA. Plant Dis. **107**: 2210.
  - Phylotype IIa, Sequevar 5, 39
  - CV Indigocrisp

- **Andrea M. G´omez, Prasanna Joglekar, Bill Cline,and Alejandra I. Huerta** (2025). First Report of Bacterial Wilt on Southern Highbush Blueberries(Vaccinium corymbosum), Caused by Ralstonia solanacearum, in North Carolina
  - Phylotype IIa, Sequevar 7
  - CV Rebel

Phylogenetic Placement of Sequenced *Ralstonia solanacearum* Species Complex (RSSC) Strains from the Southeastern United States

Ph: Phylotypes

78 genomes sequenced



6 isolates

Found in:
Pepper
Blueberry
Soil

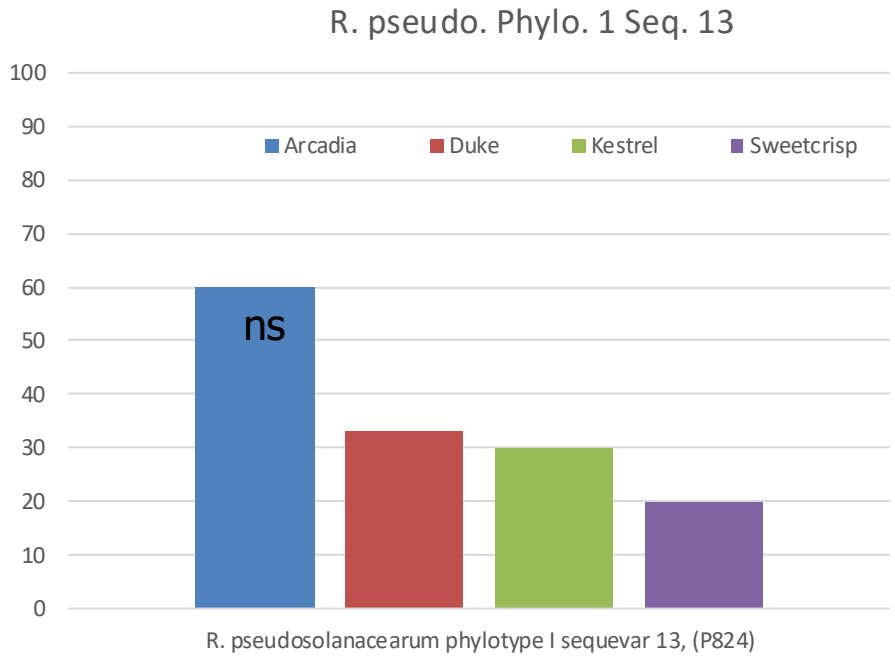
17 isolates

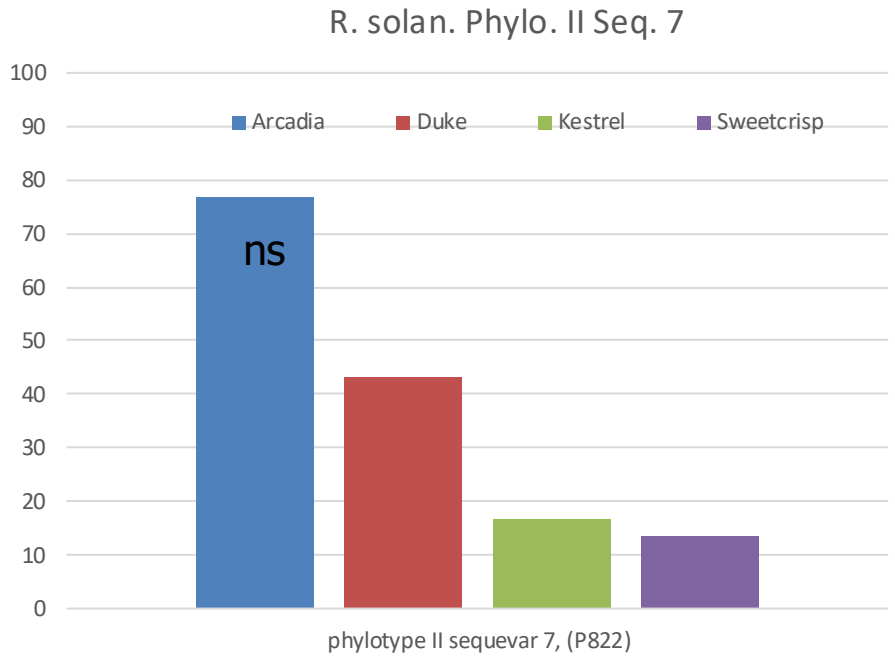
Found in:
Pond water
Tomato
Blueberry

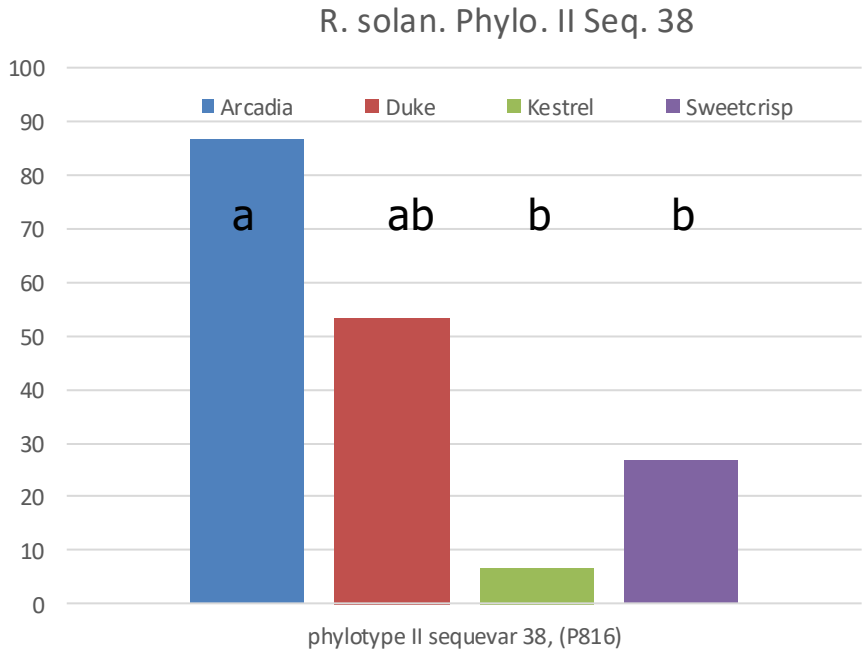
55 isolates

Found in:
Tomato
Tobacco
Blueberry

PI's Ana Maria Bocsanczy and Tiffany Lowe-Power







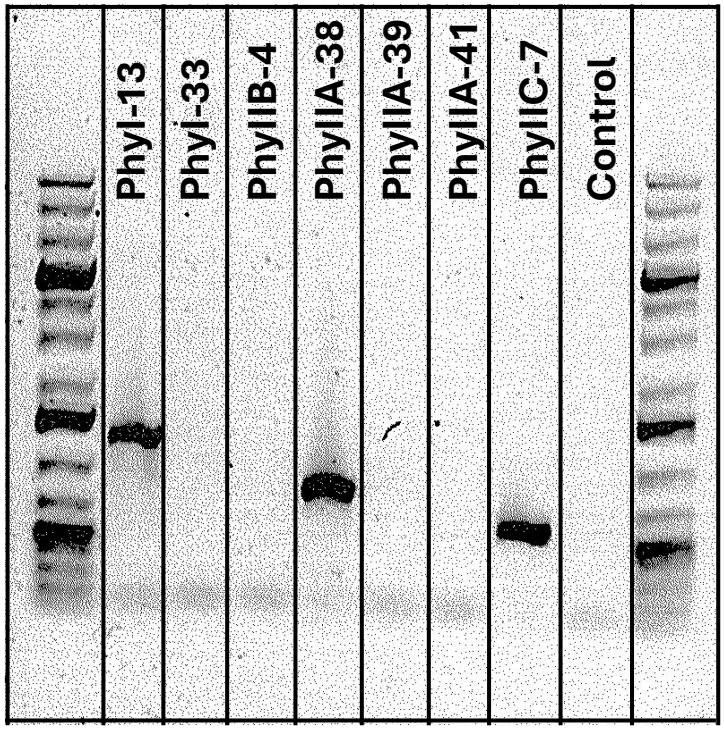
- Conner et al 2022
- Rabbiteye more resistant
- *R. pseudosolanacearum* was the most common strain

Development of a Multiplex PCR Assay for Detection of Key RSSC Groups

Target groups:
PhyIIC-7, PhyIIA-38 and Phy I-13

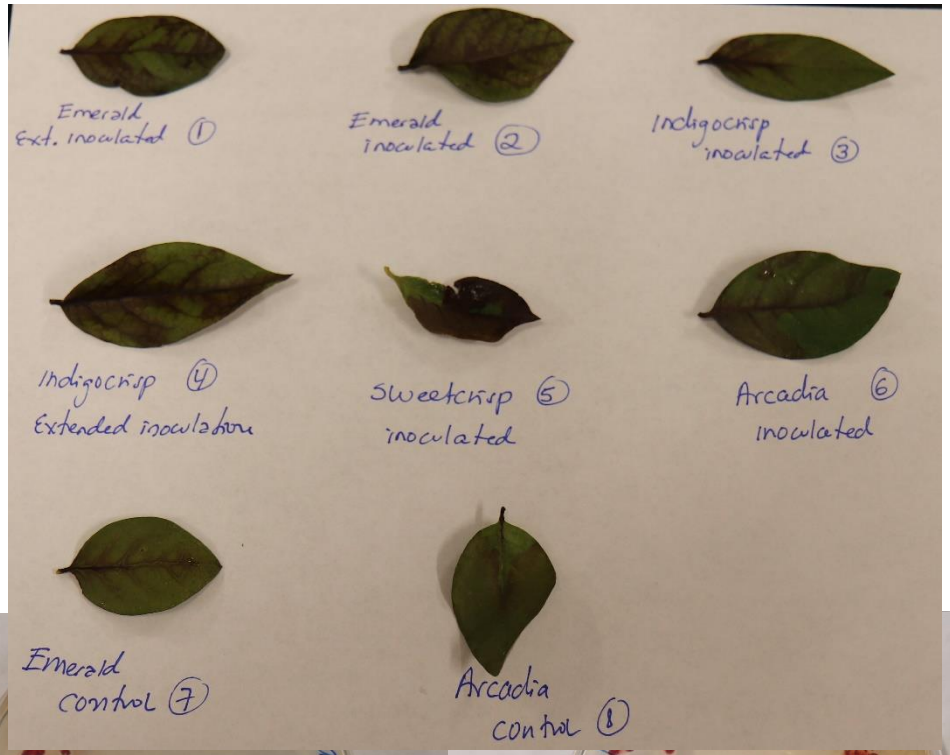
Used the genomes sequences to find regions present only in the target groups

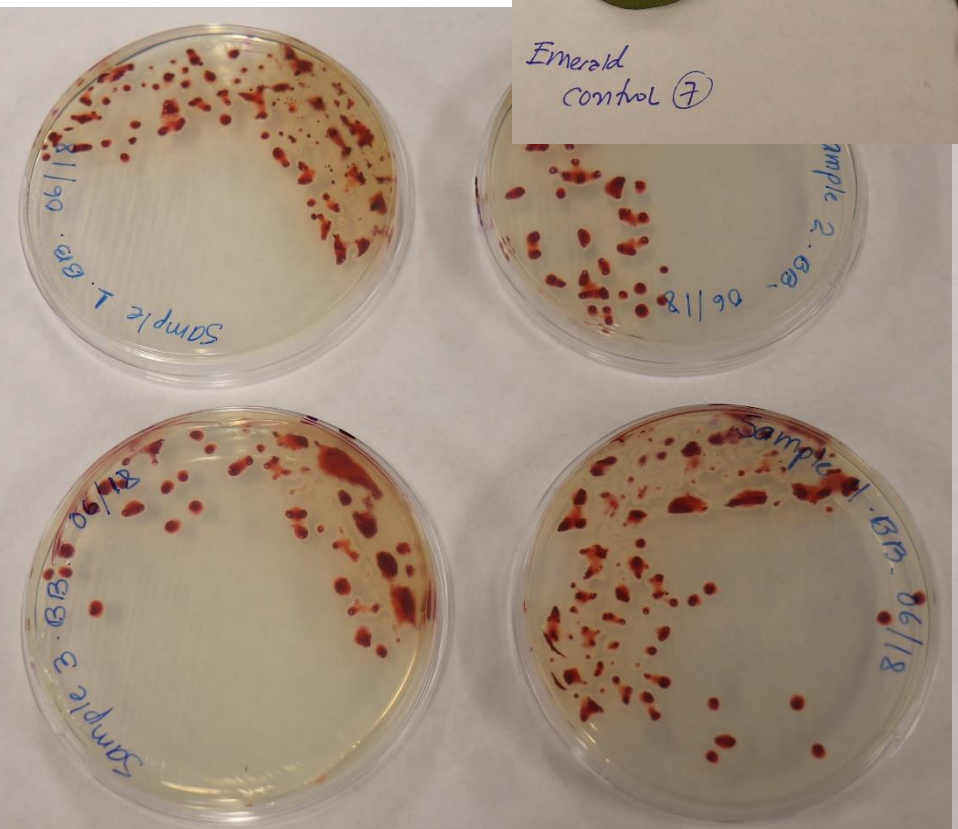
Primers designed to work together

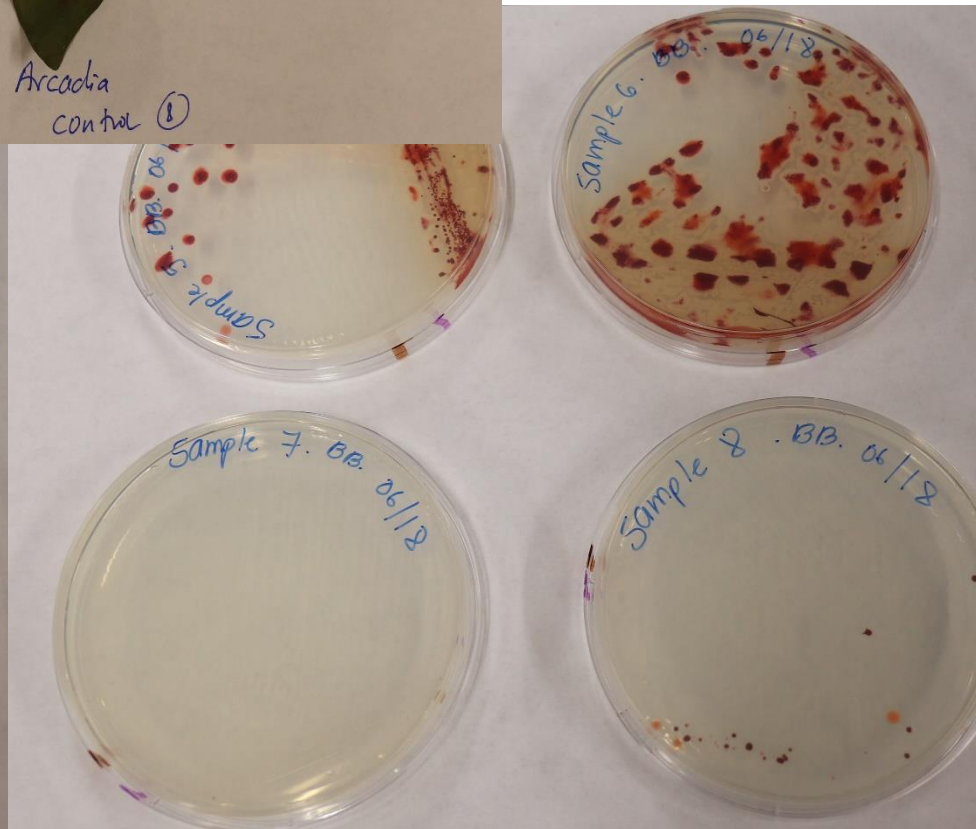


PI's Ana Maria Bocsanczy and Tiffany Lowe-Power

8 days after inoculation


Emerald
Ext. inoculated ①
Emerald
inoculated ②
Indigocrisp
inoculated ③
Indigocrisp ④
Extended inoculation
Sweetcrisp ⑤
inoculated
Arcadia ⑥
inoculated
Emerald
control ⑦
Arcadia
control ⑧


Sample 1. BB. 06/18
Sample 2. BB. 06/18
Sample 3. BB. 06/18
Sample 4. BB. 06/18


Sample 5. BB. 06/18
Sample 6. BB. 06/18
Sample 7. BB. 06/18
Sample 8. BB. 06/18

~ 6 gallons of bacterial inoculum
~ 3,000 cuttings

Lushan Ghimire, Ph.D. project

- Used the inoculation protocol on 401 genotypes
- Identified several potential genes for resistance
- Possibility for prediction of susceptibility from genomic data

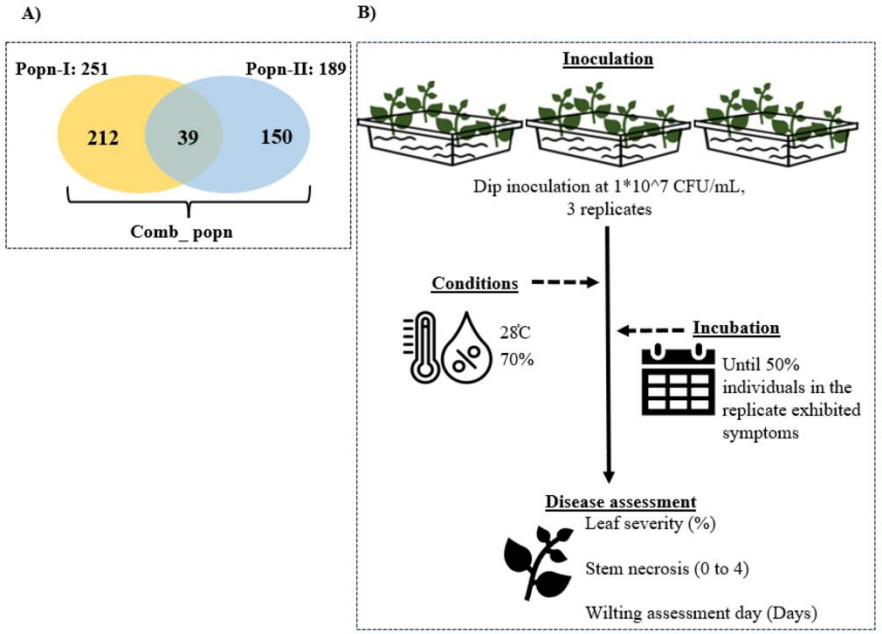


Figure 3-1. Details of phenotyping of blueberries for resistance to bacterial wilt. A) Venn diagram showing the number of individuals within each of the two populations used in the study, including overlapping individuals. B) Screening protocol developed for bacterial wilt resistance assessment in a breeding population level.

Product Screen

Products tested

Phosphites "Agrifos" (drench + foliar spray), K-phite
Oxytetracylcine "Fireline"
Peroxide "TerraClean 5.0" OMRI
Plant based "Thymeguard" OMRI
Biological "Cease" OMRI

REP 1 : 28.7 avg	avg DAY	avg NIGHT	min temp
C	**31.1**	**26.3**	**22.1**
F	88.0	79.4	71.8

REP 2: 24.2 avg	avg DAY	avg NIGHT	min temp
C	**27.1**	**21.3**	**12.2**
F	80.7	70.4	54.0

Rep 1

No treatment prevented disease

Greenhouse temperatures were very high

Rep 2

No wounding, increased volume of drench applications

Temps below ideal range

No symptoms + no detection in blueberry

Symptom development + detection in tomato (33%)

Rep 3

No wounding = no disease regardless of ideal temperature

Cool temp = no disease even when wounded

Experiment in grow room to control temp

A/C malfunction, experiment failed

Rep 4

Latent infection, very slow symptom development

Symptoms in all treatments

Management

- Exclude the pathogen from your farm
  - Avoid movement of soil and water onto the farm
  - Sanitize equipment, tools
    - Early research suggests hedging may spread the pathogen
    - Conners research confirms wound inoculation
  - Do not use surface/recycled water for irrigation
  - Purchase clean, healthy plant material

Management

- Propagation measures to prevent bacterial wilt in nurseries
  - Do not use surface water for irrigation
  - Use well or municipal water
  - Do not allow soil contact with cuttings (use benches)
  - Keep production areas free of weeds and other potential host plants, particularly solanaceous

Management

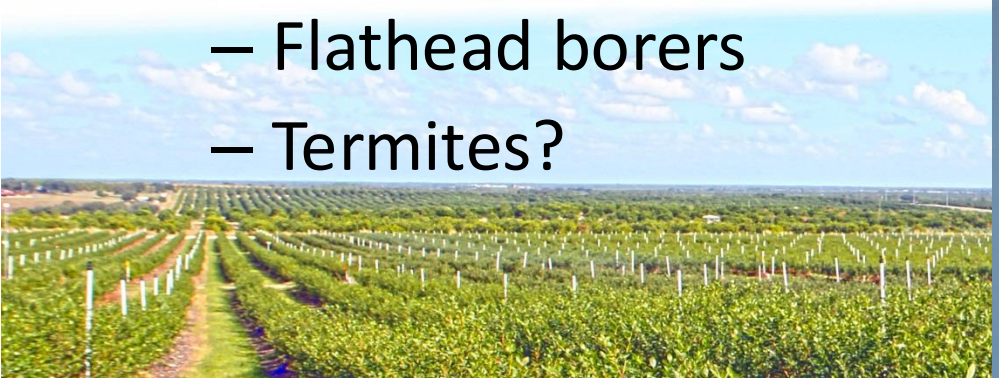
- Reduce inoculum
  - Remove infected plants and destroy them
    - The sooner the better, the more the better
  - Don’t pile them up next to irrigation ponds
- Plant varieties other than Arcadia where the disease is confirmed
  - protect Arcadia plants on farms where the disease is confirmed

Management

- Host plant resistance
  - Arcadia and Indigocrisp are the most susceptible SHB, all varieties have the potential for disease
  - Screening protocols were developed for the UF IFAS blueberry breeding program
  - Continued work in this area aims to prevent release of susceptible varieties
    - Several strains of R.s. now identified. Resistance may be oversome with high bacterial loads, conducive conditions=flooding, root damage, high heat

Management

- pH
  - High pH soil inhibits the bacterium but blueberry require low pH
  - There is some evidence lowering pH to lower limit of blueberry range may help
- Fumigation? Probably not effective
- Manage insect pests that create wounds on roots or lower stems
  - Diaprepes root weevil
  - Flathead borers
  - Termites?



Management

- Protection options
  - Very little data on blueberry
  - products labeled for Ralstonia control include some phosphonate (phyte) materials
  - application is to the soil in drench, via irrigation injection, or banded application to the bed
    - apply to beds and drench pots prior to replanting
  - these methods were shown effective preventing infection of geranium grown in infested soil
    - they do not cure infected plants
    - Foliar apps not expected to work!

Management

- EDIS publication: http://edis.ifas.ufl.edu/pp332
- K-Phite is an example product that is labeled for the disease and for blueberry
  - chemigation
    - 2 to 4 quarts in at least 200 gal of water per acre
  - drench
    - 2 to quarts in at least 100 gal of water
  - banded application
    - 2 to 4 quarts in at least 20 gal of water followed by light irrigation
  - 7 to 28 day interval

Management

- Observations first 9 years: Is it working?
  - "Phyte" drenches seemed to have protected replants and drastically slowed spread in the field
  - Disease continued to spread:
    - To new farms
    - Organic—there is no phyte option, containers have not stopped infection
    - Root injury due to insect feeding, including citrus root weevil, flathead borer, termites
    - Hurricane damage and excessive rain
      - A few additional plants in 2017 to 33% of 5 acres affected 2018

Research

- UF IFAS Extension, Research and Breeding Program are making coordinated effort
  - Doug Phillips, Extension coordinator
  - Phil Harmon, Ph.D., Cultivar screen, biological and chemical control options, pruning transmission
  - Ana Maria Bocsanczy, Ph.D. and Dave Norman
    - Genetic characterization of the pathogen
    - Screening Vacinium species—rabbiteye most resistant so far, RNA-seq targeting resistance genes for breeding
    - Rapid diagnostic system MinIon, EDNA for blueberry diagnostics
  - Patricio Munoz, Ph.D. and team
    - Screening advanced selections where the disease is known to occur, refining GWAS, molecular selection tools

Research outputs

- Blueberry and tea rose isolates are similar

Eur J Plant Pathol (2022) 163:35–50
https://doi.org/10.1007/s10658-021-02455-w

Check for updates

Identification of candidate type 3 effectors that determine host specificity associated with emerging *Ralstonia pseudosolanacearum* strains

Ana M. Bocsanczy · Peter Bonants · Jan van der Wolf · Maria Bergsma-Vlami · David J. Norman

Accepted: 22 December 2021 / Published online: 6 January 2022

Abstract *Ralstonia pseudosolanacearum* (Rps), previously known as *R. solanacearum* phylotypes I and III is one of the causal agents of bacterial wilt, a devastating disease that affects more than 250 plant species. Emerging Rps strains were identified infecting new hosts. P824 Rps strain was isolated from blueberry in Florida. Rps strains including PD7123 of these four strains with host specificity. Candidate T3E associated with host specificity to blueberry, tea rose, osteospermum, and mandevilla were identified by sequence homology. Pathogenicity assays on 8 hosts including, blueberry, mandevilla, osteospermum and tea rose with the 4 strains showed that both P824 and PD7123 are pathogenic to blueberry and

- Work on novel detection methods

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Research

Development and Validation of E-Probes with the MiFi System for Detection of *Ralstonia solanacearum* Species Complex in Blueberries

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Abstract

The blueberry industry, a fast-growing industry in Florida, is threatened by bacterial wilt, caused by the *Ralstonia solanacearum* species complex (RSSC). In 2016, distinct RSSC populations were found in Florida causing disease in blueberry. Currently, there are no tools that discriminate between RSSC populations pathogenic to blueberry and other RSSC strains. Early detection of specific RSSC strains is critical, and the Microbe Finder (MiFi) web application is a sensitive and specific tool used to detect known target pathogens in sequenced samples. MiFi is used to develop e-probes and subsequently query sample metagenomes with them. We report the development and validation of e-probes for three different RSSC populations pathogenic to blueberry using the MiFi platform. We also present preliminary data to assess the feasibility of a cost-effective integrated diagnostics system, MiFi, in combination with MinION, a pocket-sized, portable sequencer. The e-probes were validated in silico, generating simulated

Any Questions?

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