



Grape Pathology Program



Mizuho Nita, PhD
(me-zoo-jo)

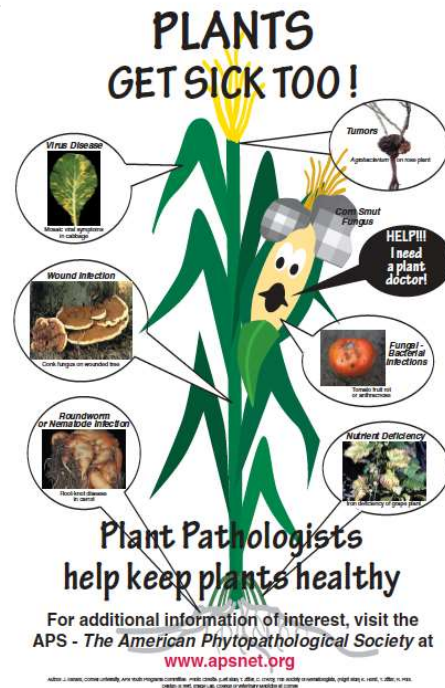
Associate professor and Extension grape pathologist

For AHS Jr. AREC Open House
17 August 2020



Plants get sick too!

- Just like us, humans, plants get sick from infection by pathogens (disease-causing organisms), such as
- **Fungi** (e.g., Athlete's foot, candidiasis or thrush)
- **Bacteria** (e.g., Lyme disease, tuberculosis)
- **Viruses** (e.g., COVID-19, flu, chickenpox)
- **Mycoplasmas** (e.g., walking pneumonia), and
- **Insects** (e.g., heartworm).

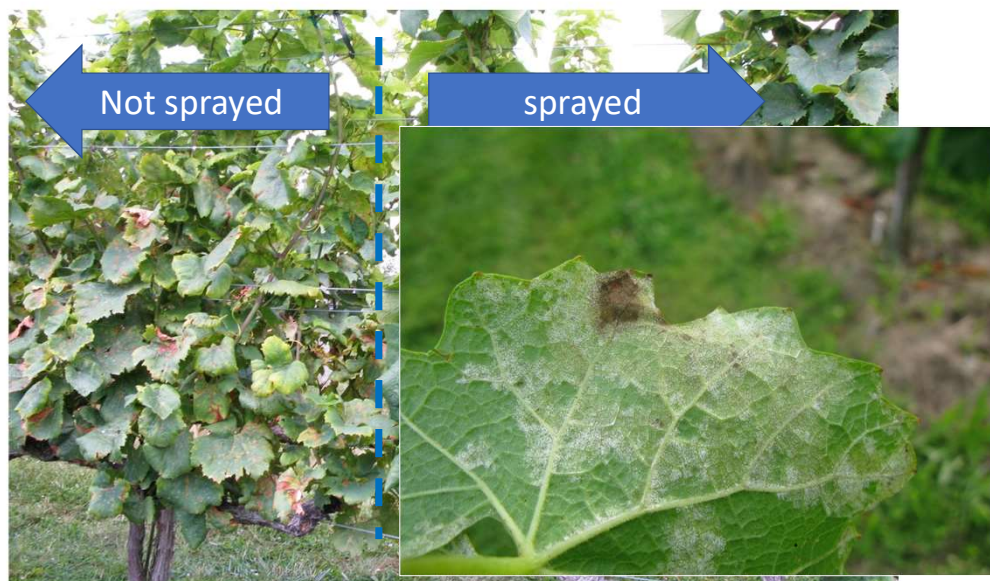


How do we manage plant diseases?

1. We can select a good environment for plants (remember, plant cannot move as much as animals!) or alter canopy structure to lower the risk of infection (**Cultural control**)
2. We can choose plants that are resistant to diseases (**Genetic resistance**)
3. We can use medicines (fungicides) to control pathogens or a vector, or make plants use their defense system (**Chemical control**)
4. We can use other microorganisms to interfere pathogens (**Biological control**)



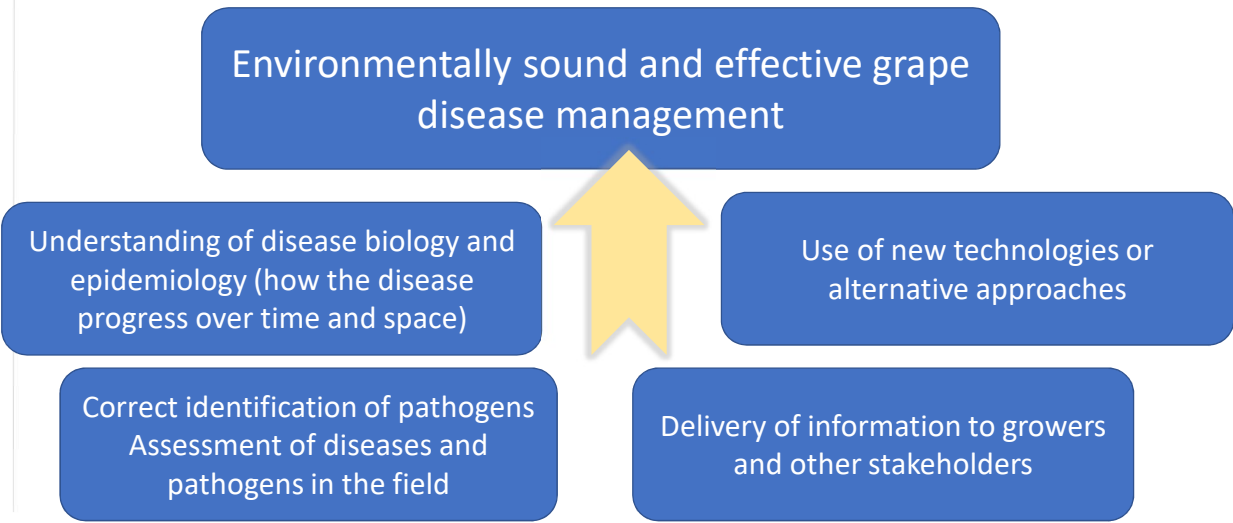
Do we really need to do all that?



Let me try one more year...



My research and extension interests



Investigations of ripe rot of grape

- Ripe rot is caused by a group of fungal pathogens.
- It can cause not only yield loss, but contamination can change wine flavor

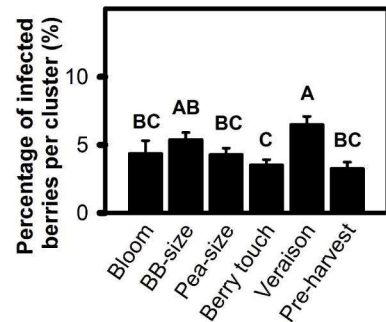


Former graduate student, Dr. Charlotte Oliver



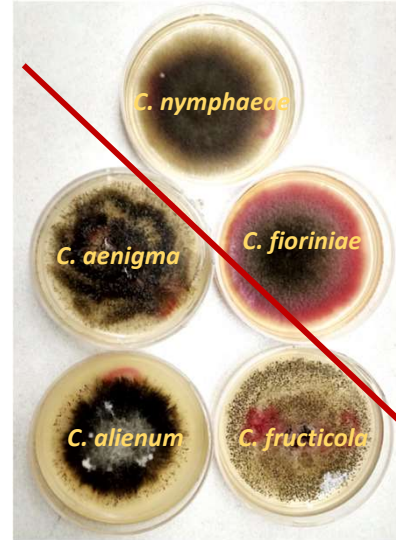
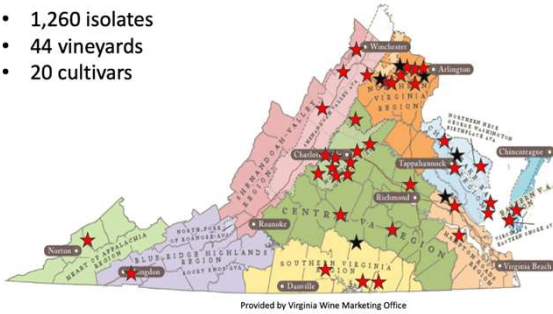
Ripe rot: infection timing

- We conducted a series of experiments to understand when the pathogen infect grape clusters.



Ripe rot: identification of species

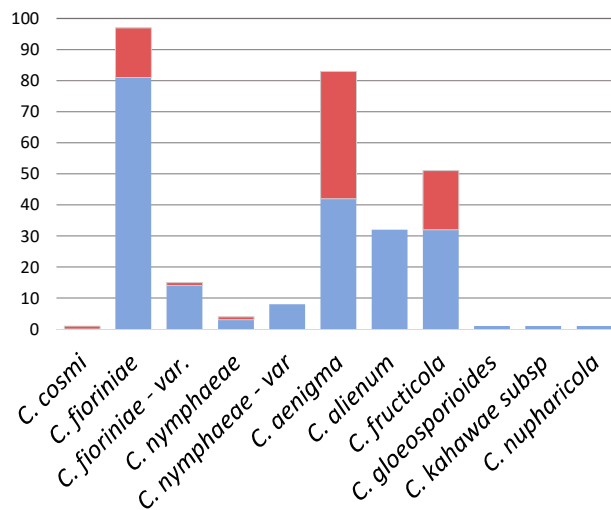
- 1,260 isolates
- 44 vineyards
- 20 cultivars



- We used a DNA-based identification method, and found five different species causing the same symptoms

Ripe rot: Fungicide resistance

- Species we found in VA are different in terms how they react to fungicides.
- Some species are more resistant to a certain fungicide group we use.
- We cannot rely on the same fungicide.





Crown gall directly damages grapevines

- Infection by a bacterium pathogen, *Rhizobium vitis*, causes plant cell to grow and reproduce without control
- When the gall damages the vascular system, the whole vine can collapse.



A biological control agent

- The biological control agent interfere with the pathogen in different form to prevent disease development.
- We formed an international collaboration with Japanese National Agriculture and Food Research Organization (NARO) to examine the efficacy of a new biological control agent against crown gall.

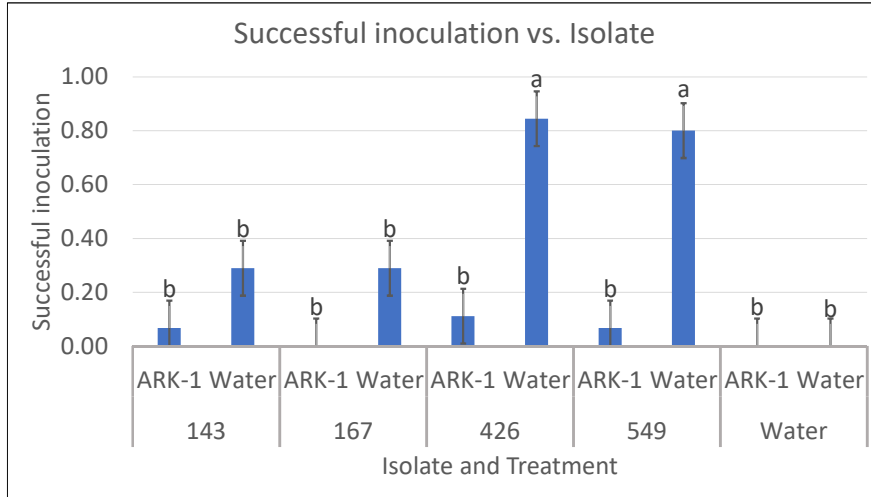


Dr. Akira Kawaguchi of NARO





We found the new biological control agent, *R. vitis* strain ARK-1 works against VA native *R. vitis*



Former graduate student, Mr. Alex Wong

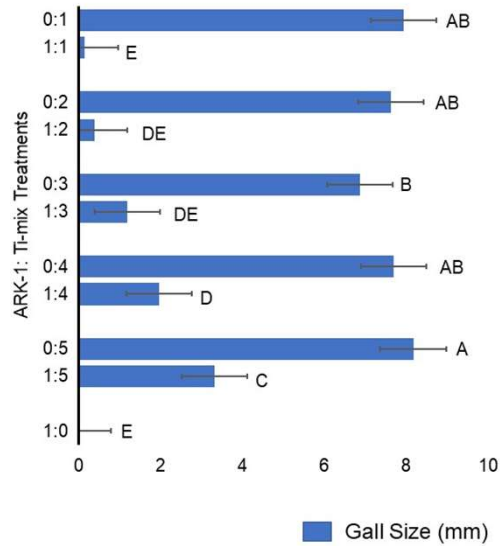


Crown gall: Threshold

- Our recent work showed ARK-1 can be effective against up to 5 times higher number of cell of tumorigenic strains.

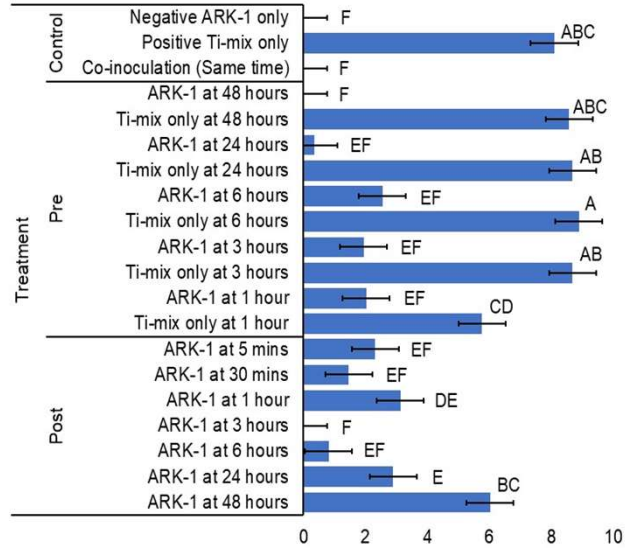


Current graduate student, Mr. Abdullah Nahiyen



Crown gall: timing of application

- We found that ARK-1 is better applied before infection by the pathogen
- Even when ARK-1 was applied after the infection, it still provided reduction in gall formation, when ARK-1 was applied within 24 hours.



Alternative approaches

- We are also investigating the effect of physical barriers to keep berries dry (= lower risk of disease development) and use of plant defense activator (= similar to immune boost)





Extension Education

- Information obtained from our research projects are presented in various Extension education outlets.



In-person Extension meetings

Horticultural & Forest Crops 2020

Grapes: Diseases and Insects in Vineyards

Douglas G. Pfeiffer, Extension Entomologist, Virginia Tech
 Anton B. Baudoin, Plant Pathologist, Virginia Tech
 J. Christopher Bergh, Extension Entomologist,
 Alison H. Smith Jr. AREC
 Mizuko Nita, Extension Plant Pathologist,
 Alison H. Smith Jr. AREC

Additional information on pest and beneficial species identification is available online at <http://www.virginiafruit.cento.vt.edu/>. Disease updates and management information is available at <http://www.grapepathology.blogspot.com>.

In January 2018, a new invasive insect was found in Virginia. *Colletes cingulipes* is expanding its range from the Southeast to the Northeast, where it is causing damage to some crops on some.

part of the quarantine/public Court order (2018-03-01) (SCEdgramStreamId), loss in our agricultural should be aware. handle finds you information on vineyards, refer to vt.edu/ENTO/ENT information, visit Cooperative Extension updated control in Fruit (<https://www.vt.edu/ENTO/ENT>) report suspected di page (<https://ask.c>)

Application rates: T

Trunk Disease Diagnostics App

This web application will help diagnosis of a trunk disease based on symptoms, and provide management options for the infected vine(s). The results and following recommendations are based on the responses you provide through the image survey of symptomatic tissues. To begin, select the tissue where you find the most prominent symptoms.

Prepared by

IPM Dashboard

Filter Location

Add Action/Event

Recent/Upcoming Events

Click here to add a spray event.

Date: 08/08/2020 - 07:00p

2020-08-08 AHS AREC 2019 MN - Verasion (Ch)

Block: AREC 0115, AREC 0102, AREC 0101, AREC 0116

Volume: 31.5 gals

- Lime Experience @ 8.4 fl oz
- Phostrol @ 2.85 pt
- Rotenone @ 3.04 fl oz
- Carbaryl 4L @ 1.05 qt

Mizuho

@grapepathology

A grape pathologist at Virginia Tech's AHS Agricultural Research and Extension Center (AREC) at Winchester, VA. (Please use the email for questions.)

Winchester, VA | grapepathology.blogspot.com | Joined February 2011

101 Following 346 Followers

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Mizuho @grapepathology · Jul 20
 Presentation slides and a list of short PPT materials. [diva/ENTO/HT](https://www.vt.edu/ENTO/ENT)

Grape Pathology at Virginia Tech

GrapePathVATech - Agricultural Service

Extension publications

Web-based applications



Acknowledgement

2019-20 Grape Path Team



Abdullah Nahiyon



Amanda Bly and Diana Scorpio



Morgan Gannon

Mikako Gomyo (Japan Ministry of Taxation)



Akiko Nita



Dr. Diana McHenry



Akiko Mangan



Robert Burgholzer



Dr. Jungkwan Lee (Dong-A Univ., Korea)

Questions?

