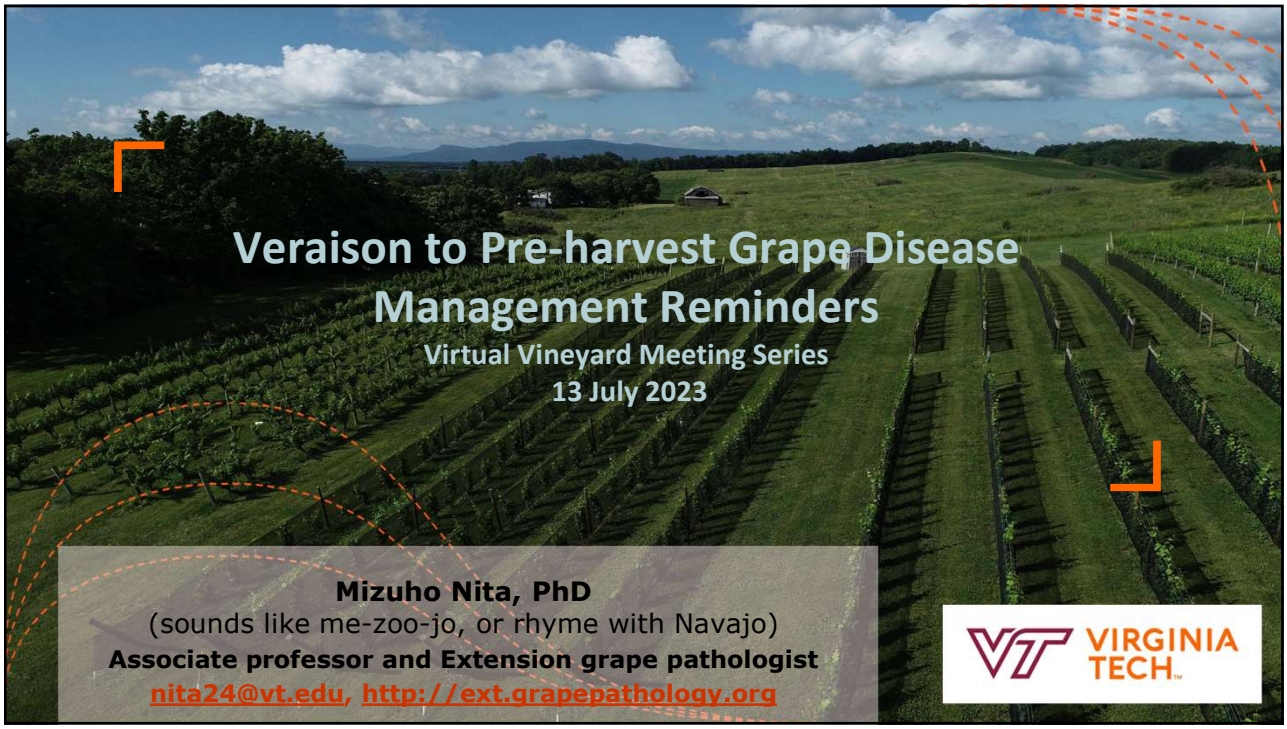
Veraison to Pre-harvest Grape Disease Management Reminders
Virtual Vineyard Meeting Series
13 July 2023
Mizuho Nita, PhD
(sounds like me-zoo-jo, or rhyme with Navajo)
Associate professor and Extension grape pathologist
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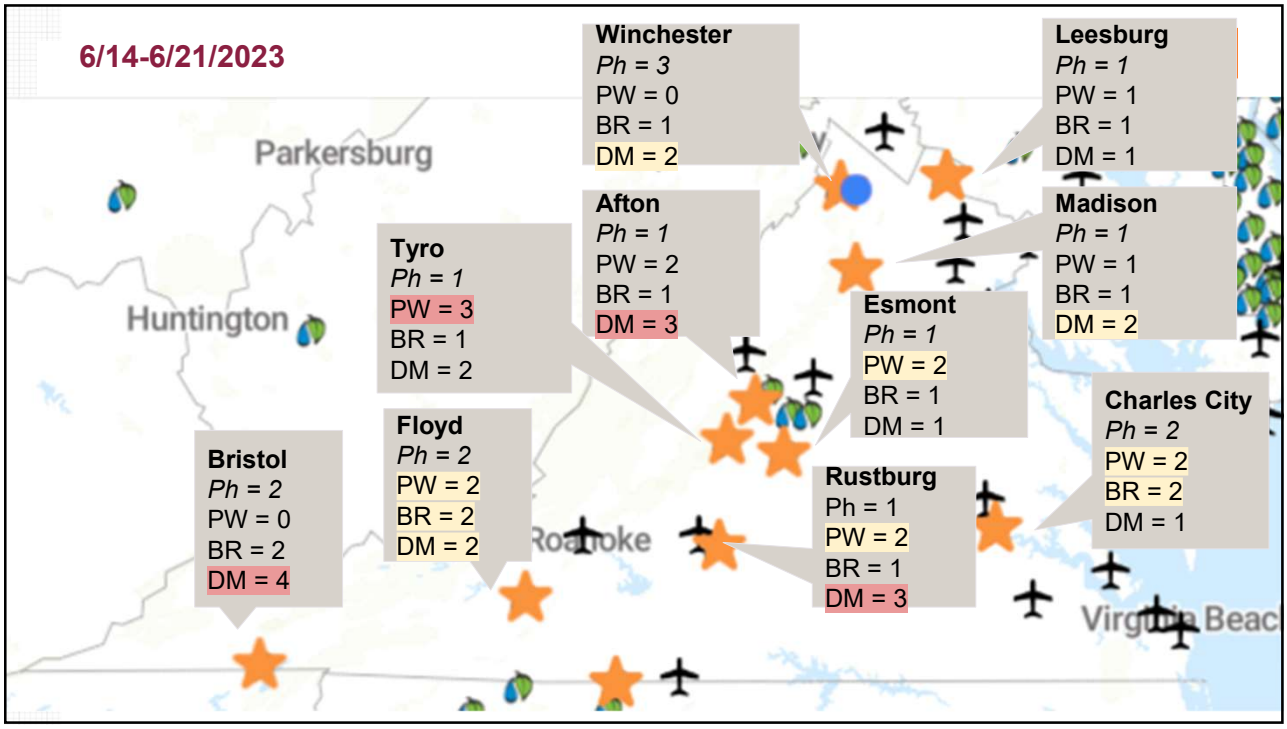
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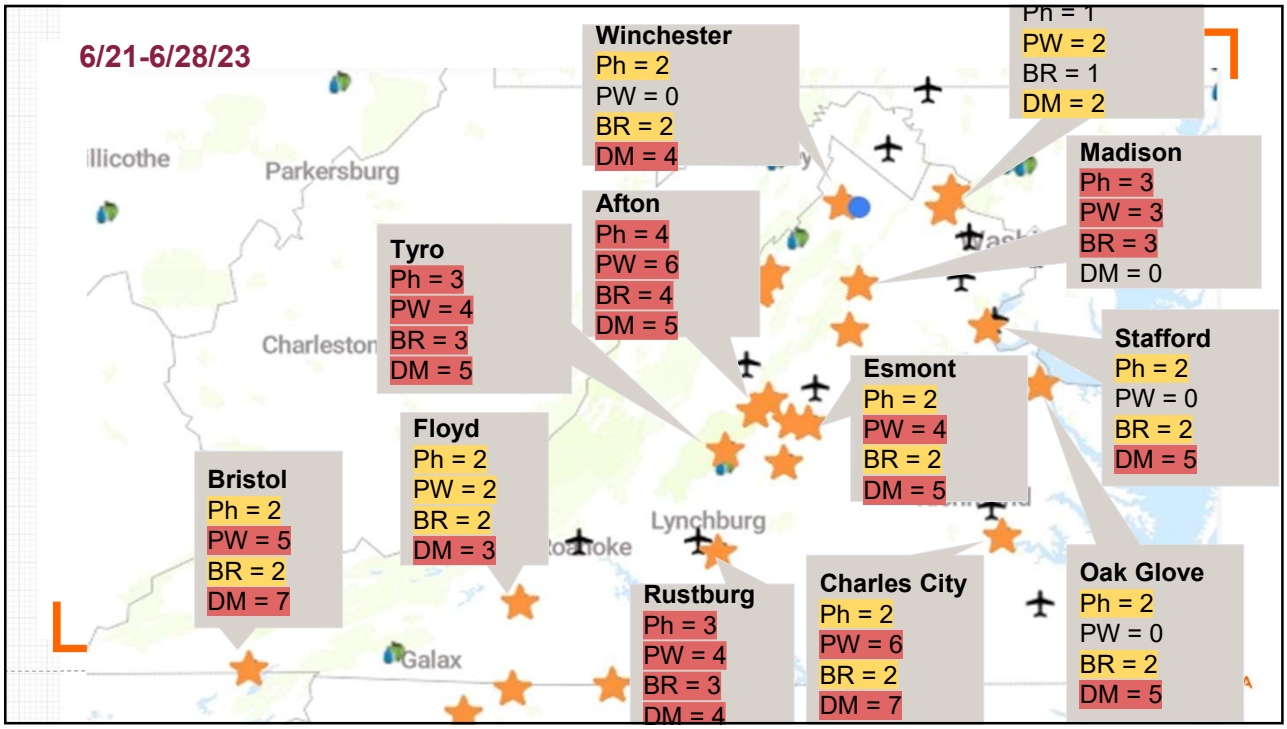
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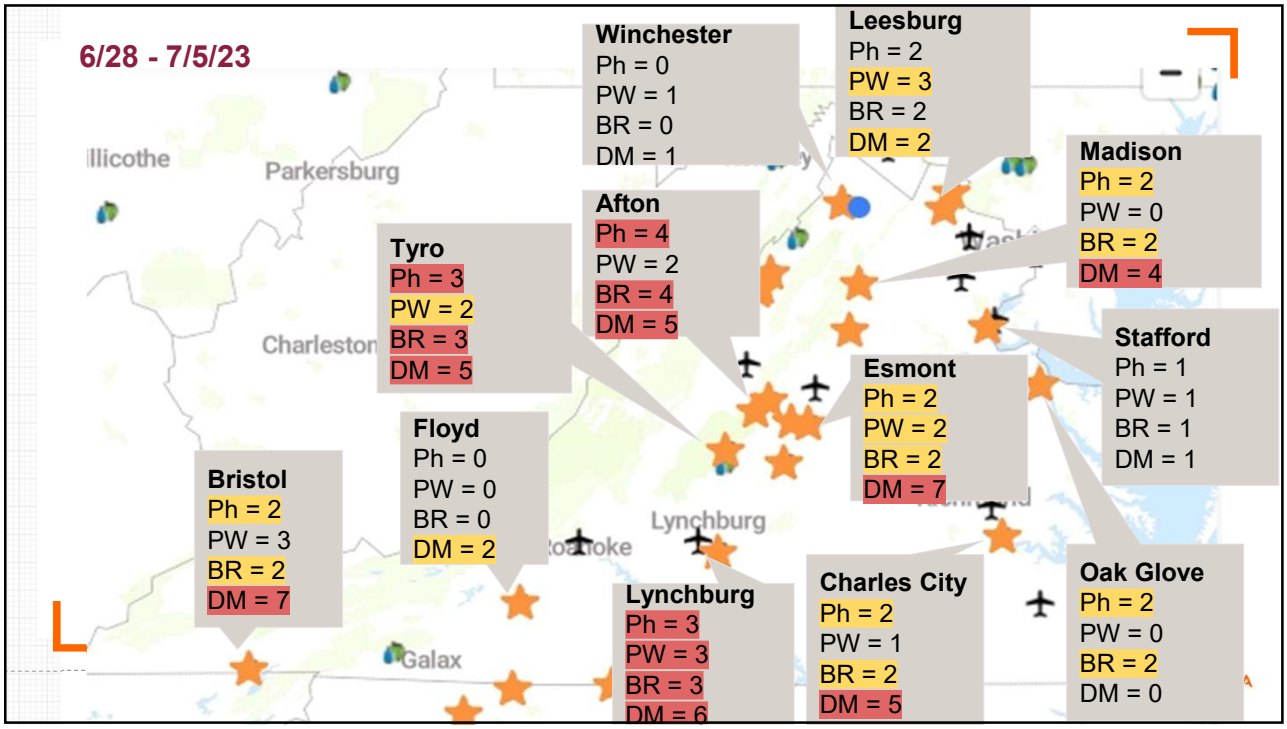
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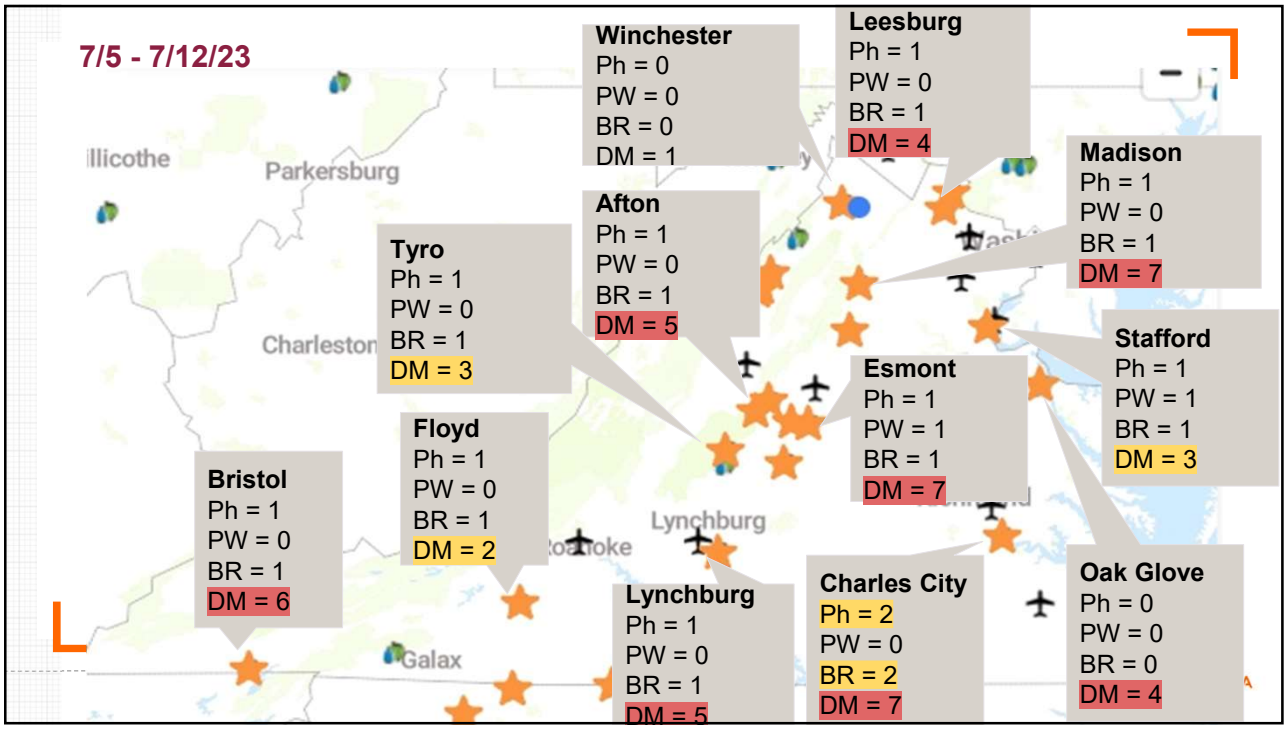

Botrytis management

- Timing: At bloom, bunch closure (the last opportunity to deliver fungicides inside of the cluster), and at veraison (spore availability)
- Canopy management is critical because the outbreak is often associated with a long wetness event.
- Injury management (***GBM***, Birds, PM) is also important

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Botrytis Management
Preventative fungicide options

- **Fair to Good:** Group 2: iprodione (Rovral/Meteor – resistance = low/mod risk),
- **Good, but…:** Group 7 (SDHI): ~~boscalid (Endura),~~ Luna Experience, Kenja, Miravis Prime (– resistance = high)
- **Good:** Group 9: cyprodinil (Vanguard, Inspire super, Switch- resistance = mod)
- **Good:** Group 12: cyprodinil + fludioxinil (Switch – resistance = mod)
- **Good:** Group 17: fenhexamid (Elevate – resistance = unknown)
- **Fair:** Group 19: polyoxins (Oso, Ph-D – resistance = mod)
- **Fair:** Group M4: captan – fair activity, but it will be a good mixing partner!
- **Fair:** Group M1: copper (the same comment as above)
- **Bad:** QoI fungicides, Pristine (7 + 11), Topsin-M

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Ripe rot

- Caused by *Colletotrichum* species.
- We found the average of 2.7 species per vineyard in our previous survey.
- They vary in the level of susceptibility against fungicides.
- We tested 10 modes of action, but **none** produced satisfying results consistently.

Ripe rot application timing: at bloom, veraison, plus you may need one or two more, if you have susceptible cultivars with a history of outbreak…

- All materials are "fair" in efficacy by itself
- MIX mancozeb (M3), captan (M4) or a fixed copper (M1) with
  - a QoI (Pristine, Flint, Abound, FRAC = 11), Rovral (2), Switch (9 + 12), tebuconazole (3),
  - or Howler (not as good as Switch)
  - Copper is not as effective as mancozeb or captan
- In 2022 trial, Mancozeb or Aprovia Top applied at bloom, then Howler plus captan or Switch plus captan applied at veraison and on provided good controls.
  - Another successful treatment was Switch plus Howler applied three times

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Downy Mildew

- It can infect leaves and berries, berry infection can cause serious damage
- Heavy leaf infection can cause defoliation

Oily spot appearance on the upper surface

Picture on the center: Organic grape production guide: OSU, Ellis and Nita 2004

Humidity drives downy mildew

- **Canopy management**
- Pre-bloom: Consider not only infection event (=rain), but also warm and humid nights (>60F and 80-90%) that promote spore production (2009, 2013, and 2018…)
  - Overwintering spores are active for 3 to 6 months
- After bloom: Critical time for the cluster runs about 4-6 weeks.
- After critical time: Leaves are still susceptible to the infection.
  - Late summer infections

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Downy Mildew
Timing: all season
Clusters are susceptible from bloom to 4-6 wks after bloom

- **Preventative fungicide application**
  - **Good:** Mancozeb, ziram (Dithane, Penncozeb, Gavel, etc. Group M3), Ranman (Group 21 - 30-day PHI), captan (Group M4), copper (Group M1)
  - **Good, but…: Revus/Forum (Group 40 – resistance spreading quickly)**, Zampro (Group **40** + 45), Note: Forum has a 30-day PHI
  - **Don't know:** Lifeguard and Zonix (defense activators) - inconsistent reports, please use them with a caution (can be a good rotation or tank mix partner)
  - **Bad:** Any QoI (Group 11) fungicides (e.g., Aboud, Pristine, etc.)

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Downy Mildew
Timing: all season
Clusters are susceptible from bloom to 4-6 wks after bloom

- **Kick-back fungicide application** (**after the rain, not after you see downy!**)
  - **Good:** Phosphonate (Prophyt, Phostrol, etc. Group P07 (used to be 33)), Ridomil products (Group 4),
  - **Poor:** Tanos (Group 11 + 27) note: we did not find a good result with Tanos in VA), Tanos need a mixing partner

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Tank-mix to reduce fungicide resistance development risk

Mix one of them with other material
with "number-only" FRAC group (e.g., 3, 7, etc.)

- ~~Black rot: mancozeb (M3), ziram (M3)~~
- Downy mildew: ~~mancozeb (M3)~~, copper (M1), captan (M4), ziram (M3 - 21-day PHI), phosphite (P07 - please do not overuse!)
- Powdery mildew: sulfur (M2) [some growers use stylet oil, but the oil cannot be used with sulfur or captan - make sure to have at least two weeks in between sprays!]

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Tank-mix to reduce fungicide resistance development risk

- Botrytis: captan (M2) or copper (M1) (both are poor-to-fair materials for Botrytis, but I think they are good mixing partners)
- Ripe rot and bitter rot: ~~mancozeb (M3)~~, captan (M4), or copper (M1) (copper products do not list ripe rot as a target, but provided moderate reduction in some of our trials)

Limit the use of ”number-only” FRAC group to twice a season

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If you have seen potential resistance issue…

- If you see downy mildew, powdery mildew, Botrytis, or black rot developing even after appropriate sprays, please contact either Dr. Baudoin or me
  - abaudoin@vt.edu
  - nita24@vt.edu

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