

# Update on UC Davis Strawberry Breeding Program

**Mitchell J Feldmann**

University of California, Davis  
College of Ag and Environmental Sciences  
Department of Plant Sciences  
UCD Strawberry Breeding Program

UC ANR Annual Production Meeting  
Salinas, CA, USA  
02/12/2025





# UCD Strawberry Team<sup>+</sup>

**Pictured:** Steven Knapp, Omar Gonzalez-Benitez, Hillel Brukental, Glenn Cole, Mitchell Feldmann, Marco Castellacci, Jade Dilla-Ermita, Dominique Pincot, Mishi Vachev, Marta Bjornson, Alicia Sillers, Nico Jimenez, Peter Henry, Isaac Rainwater, Cindy Ramirez Lopez, Randi Famula

**Not Pictured:** Eduardo Garcia, Nayeli Valencia, Margaret Honig, Mary Madera, Paul Skillin, Caitlyn Morgan, Ella Halberstadt, Renata Wilson, Noah Kulchin





# Thanks to our supporters, collaborators, and funding agencies!



All photos credited to Fred Greaves Photography for UC Davis.

# Update on personnel







**Dr. Mitchell J.  
Feldmann**

Director of Strawberry  
Breeding Program



**Dr. Steven J. Knapp**

Former Director of  
Strawberry Breeding  
Program



**Glenn S. Cole**

Field Manager &  
Strawberry Breeder



**Allison Krill-Brown**

Strawberry Breeder



**Dr. Mitchell J.  
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**Allison Krill-Brown**

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# A growing team

- **Scientists**

- Cindy Lopez (Assistant Breeder)
- Randi Famula (Genotyping Lead/Lab Manager)
- Dominique Pincot (Pathology Lead)
- Marta Bjornson (Molecular Biology Lead)

- **Staff**

- Nayeli Valencia (Greenhouse Manager)
- Eduardo Garcia (Farm Manager)
- Ella Halberstand (Fruit Lab Manager)
- ??? (Nursery Manager)

- **Postdoctoral Researchers**

- Dr. Hillel Brukental
- Dr. Shai Torgeman
- Dr. Mishi Vachev

- **Graduate Students**

- Paul Skillin
- Alicia Sillers
- Caitlyn Morgan
- Adrianna Ng
- Carly Godwin

- **Undergraduate and Highschool Students**

- Ryan Chiang, Audrey Hardjabrata, Keira Weireter, Liam Sy, Cyrus Brown

# A growing lab

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- Paul Skillin (PhD)
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- **Undergraduate and Highschool Students**

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- Liam Sy, Cyrus Brown



If there are questions about the research being conducted, **please contact us!**



# Update on Disease Research



# 9 Diseases being studied





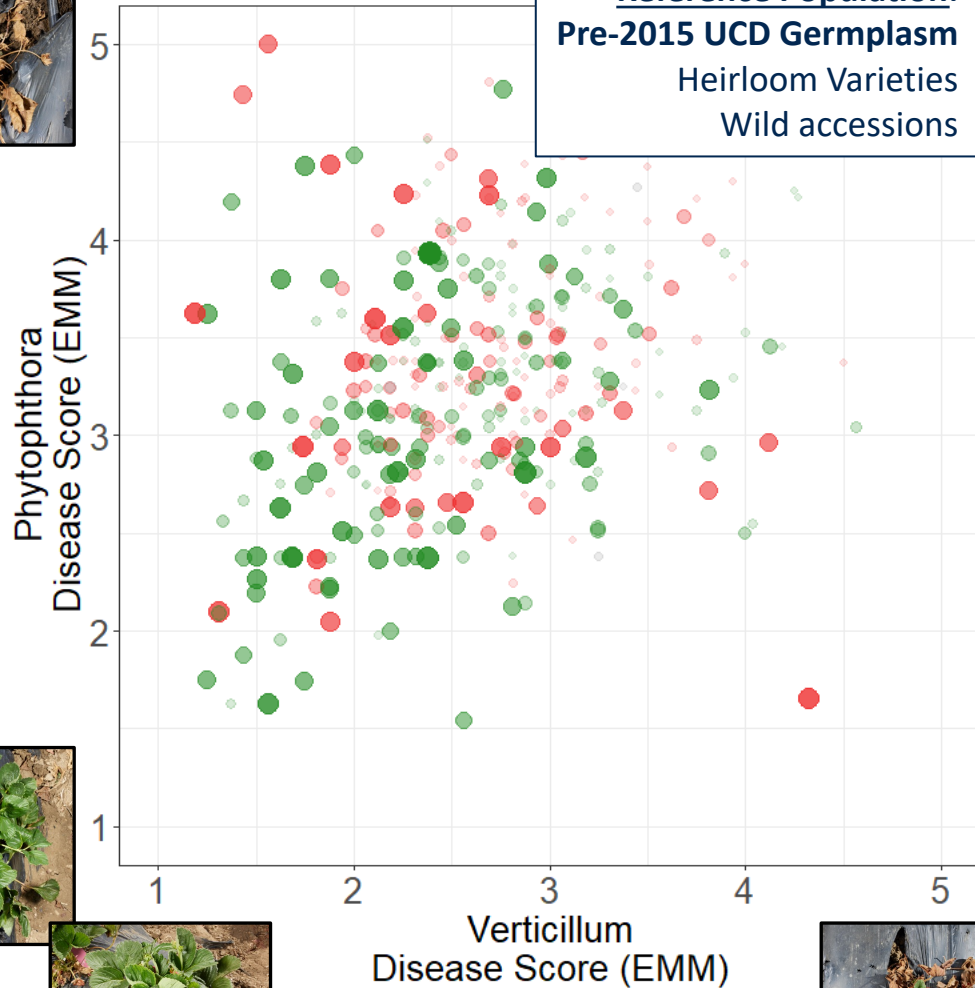
# 9 Diseases being studied



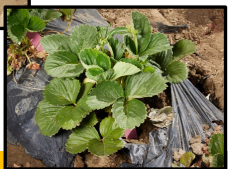
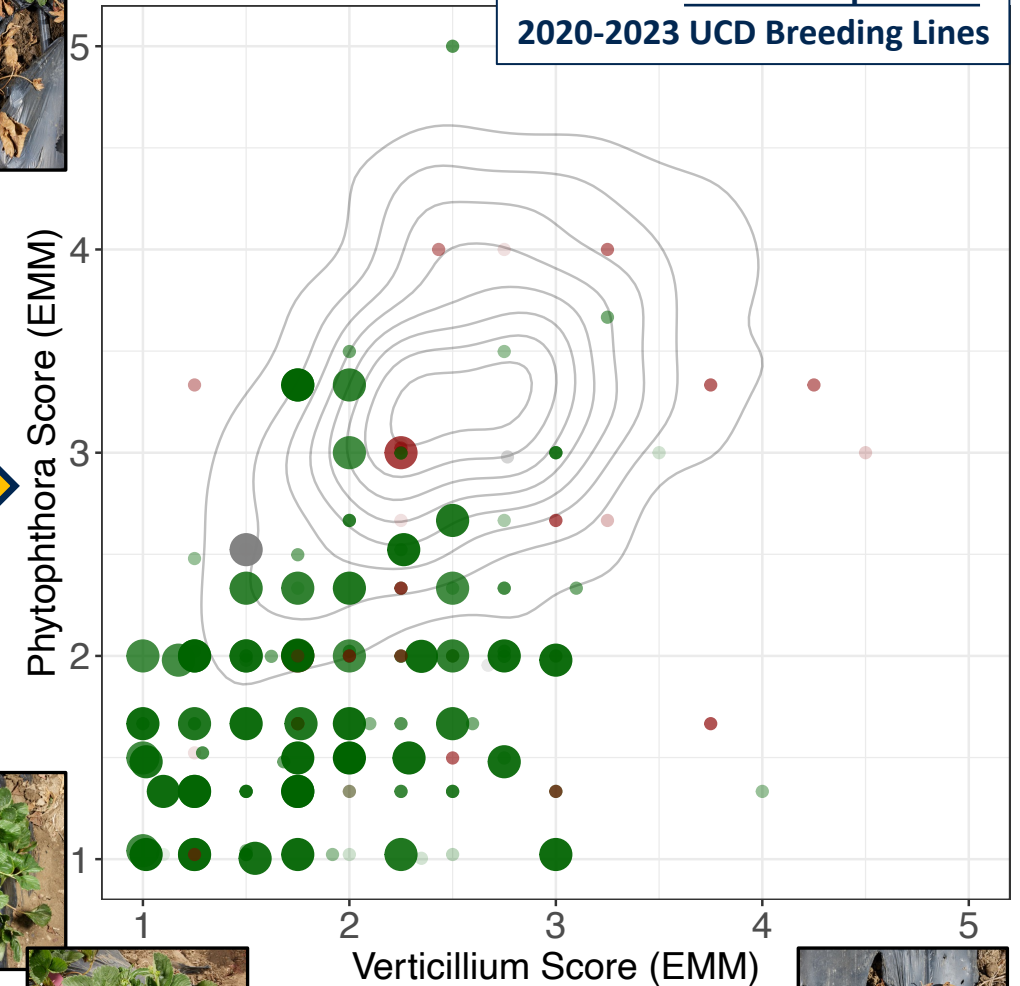
# Fusarium oxysporum Race 1



**Reference Population:**  
Pre-2015 UCD Germplasm  
Heirloom Varieties  
Wild accessions



**Current Population:**  
2020-2023 UCD Breeding Lines





# *Fusarium oxysporum* Race 1

‘Monterey’ is very susceptible.



Fall planted farm trial in Watsonville, CA  
near San Andreas Rd.





'UCD Finn'  
FW1 r/r

'UCD Mojo'  
FW1 r/r

'UC Eclipse'  
FW1 R/r

Summer plant  
product trial in Santa  
Maria, CA 2021





**'Albion'**

FW1 r/r

**--- 4 New UC Varieties ---**

FW1 R/r

Fall planted farm in  
Orangevale, CA 2024

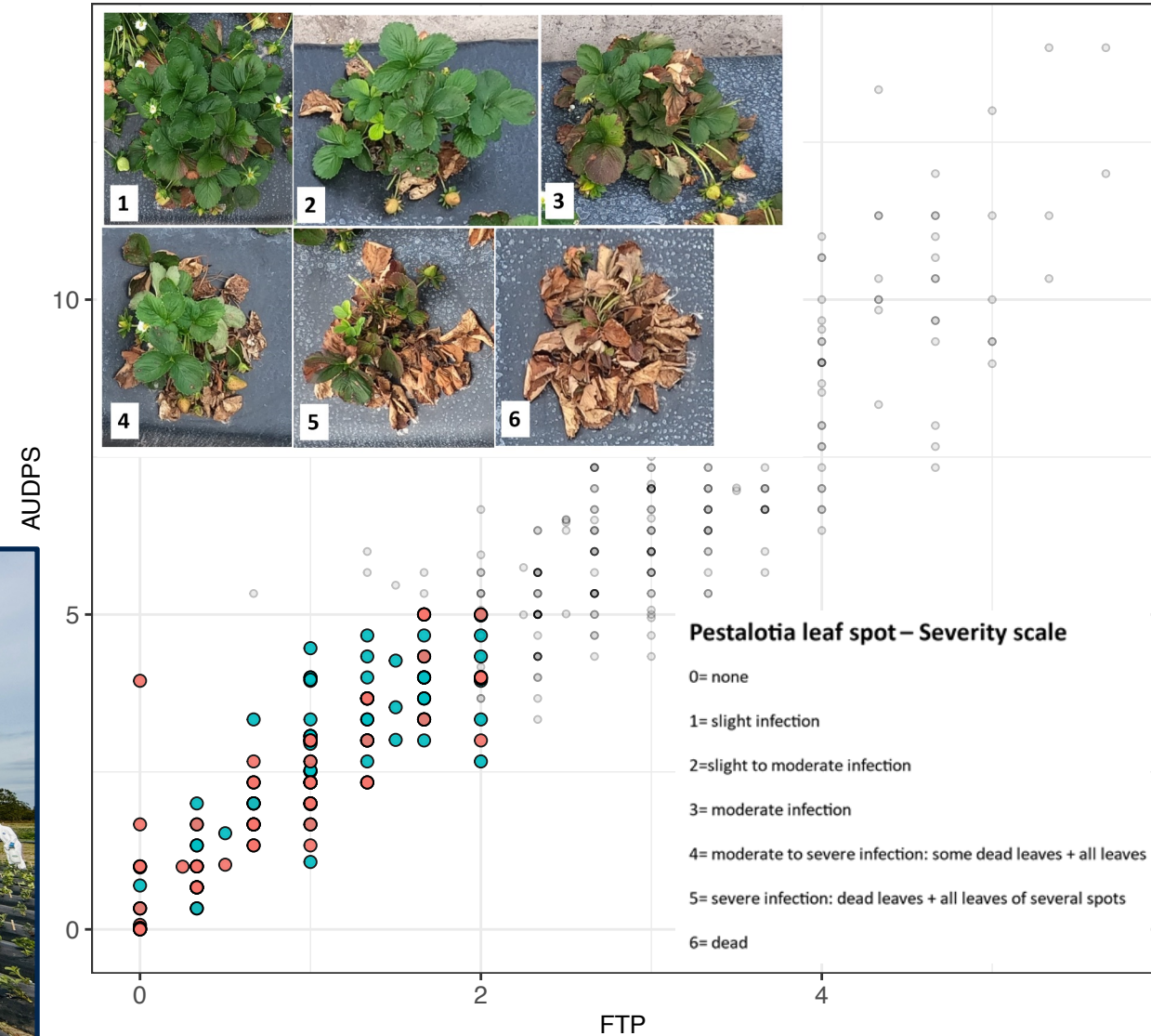


# Neopestalotiopsis sp. (NPT)

- Trialing 434 strawberry varieties from the UC Davis Strawberry Breeding Program to identify resistance to NPT.
  - Work being conducted in Florida with the UF breeding team to negate risk of outbreak
  - Photos courtesy of Dr. Cheryl Dalid, UF



We are looking at opportunities to conduct replicated, open-field trials in Mexico.



# Neopestalotiopsis sp. (NPT)

- Trialing 434 strawberry varieties from the UC Davis Strawberry



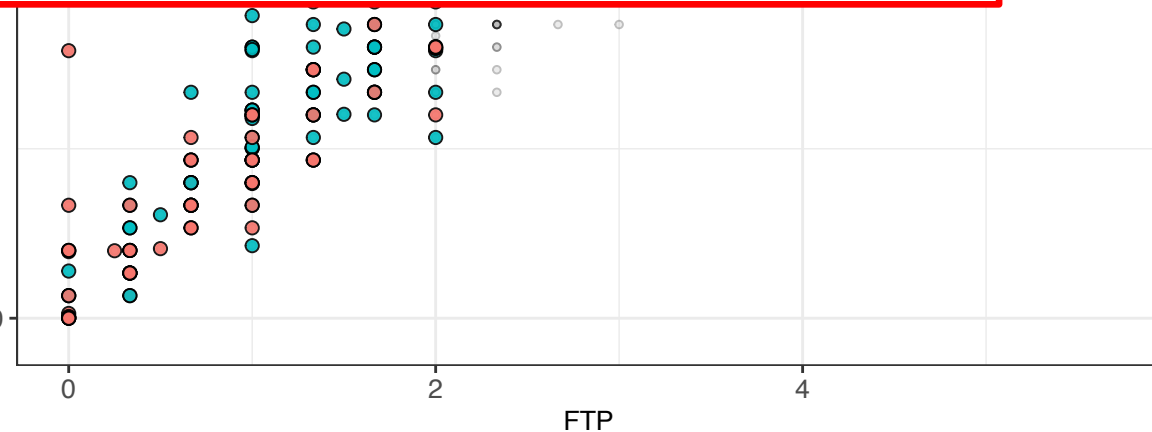
Breeding  
resistance

- Work by  
breeding

**86 / 172** resistant-moderate resistant genotypes are from UC Davis 2018-2022, including 8/12 cv. **Monarch, Victor, Surfline, Keystone, Warrior, Valiant, Royal Royce, Golden Gate**

## Pestalotia leaf spot – Severity scale

- 0= none
- 1= slight infection
- 2=slight to moderate infection
- 3= moderate infection
- 4= moderate to severe infection: some dead leaves + all leaves with at least one spot
- 5= severe infection: dead leaves + all leaves of several spots
- 6= dead

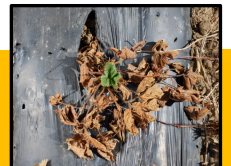
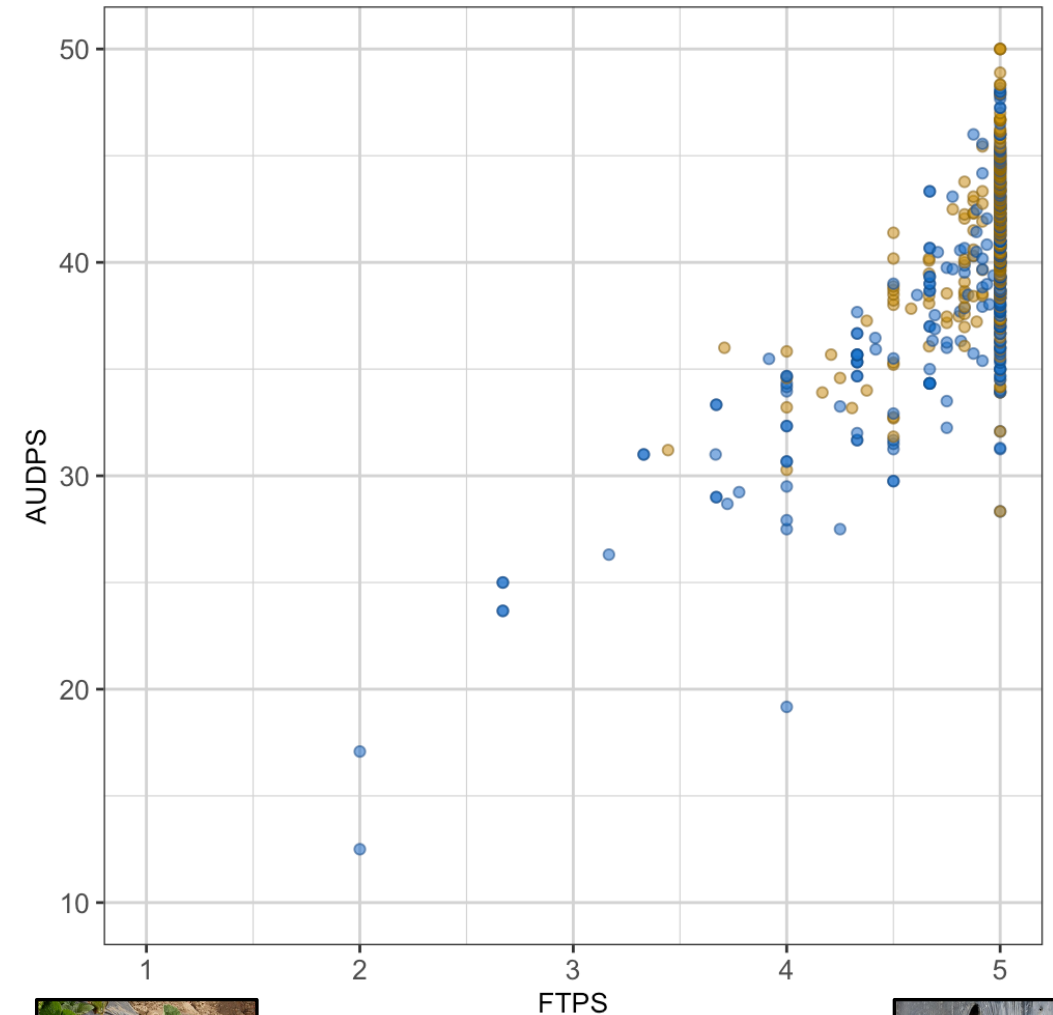




# *Fusarium oxysporum* Race 2

>300 genotypes  
completely dead

- Trialing 598 strawberry varieties from the UC Davis Strawberry Breeding Program to identify resistance to NPT.
  - Work being conducted in collaboration with USDA (Peter Henry, Jade Dilla-Ermita), PSI, Driscoll's
  - All experiments are being conducted at Biosafety Level 2 in greenhouses or growth chambers to negate outbreak risk.







# *Fusarium oxysporum* Race 2

It is too early to say, but after 5 weeks, 50% of seedlings have no symptoms.

- We are testing seedling populations at UC Davis, more with USDA this spring





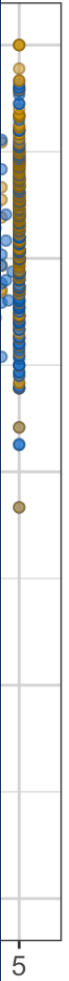
# Fusarium oxysporum Race 2

Too early to say, but some seedlings after 6 weeks XX% of seedlings have no symptoms.



Caitlyn Morgan

Thank you,  
Peter and Jade!





# *Macrophomina phaseolina*



**1**

**2**

**3**

**4**

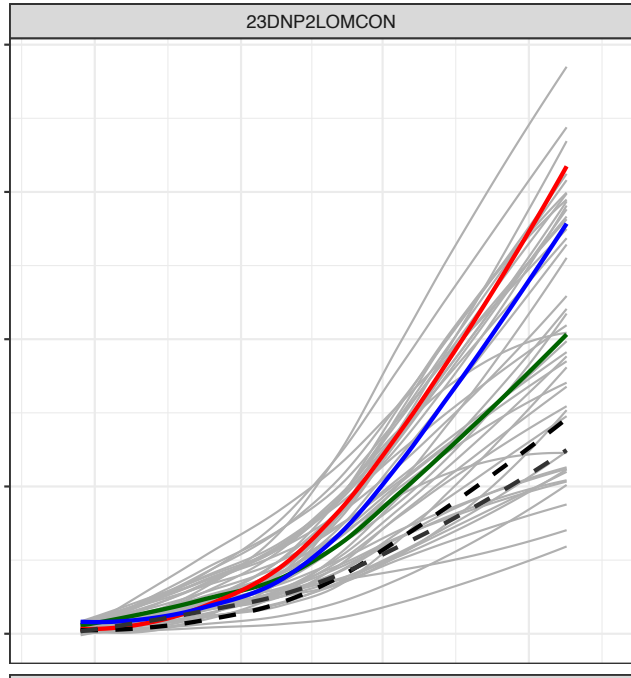
**5**

Resistant	Susceptible			
Asymptomatic	Symptomatic			Deceased

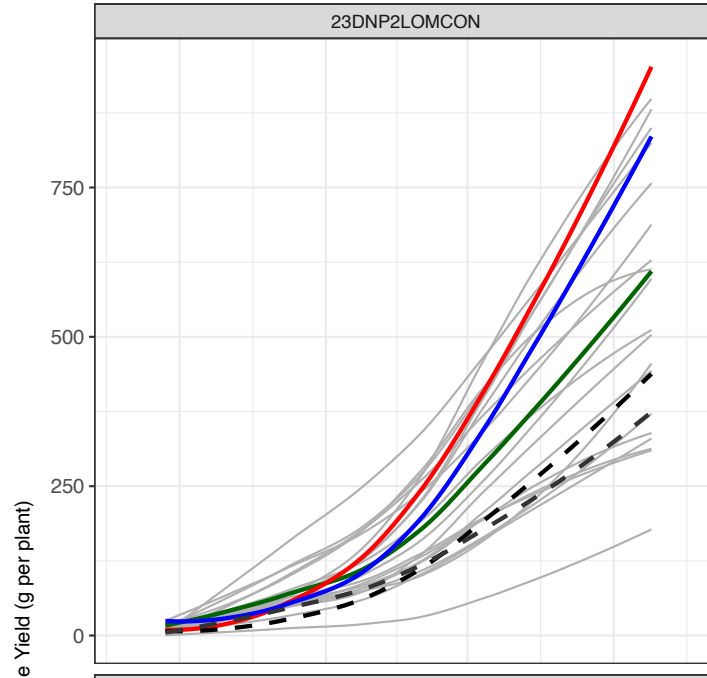
# Macrophomina phaseolina



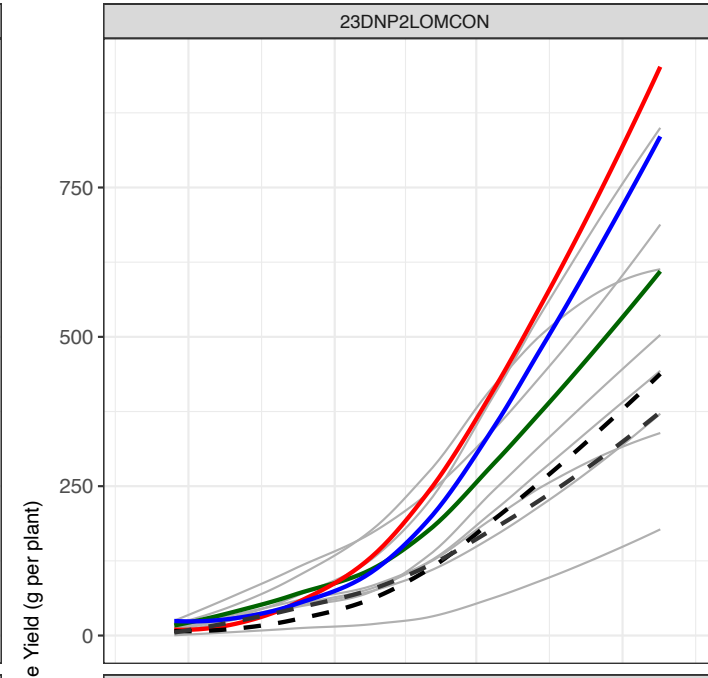
Fusarium Wilt R1 Resistant Breeding Lines (>70%)



Macrophomina Resistant Breeding Lines (>30%)



4-Way Resistant Breeding Lines (>10%)



- UC Eclipse
- UCD Royal Royce
- UCD Valiant
- - Monterey
- - Albion



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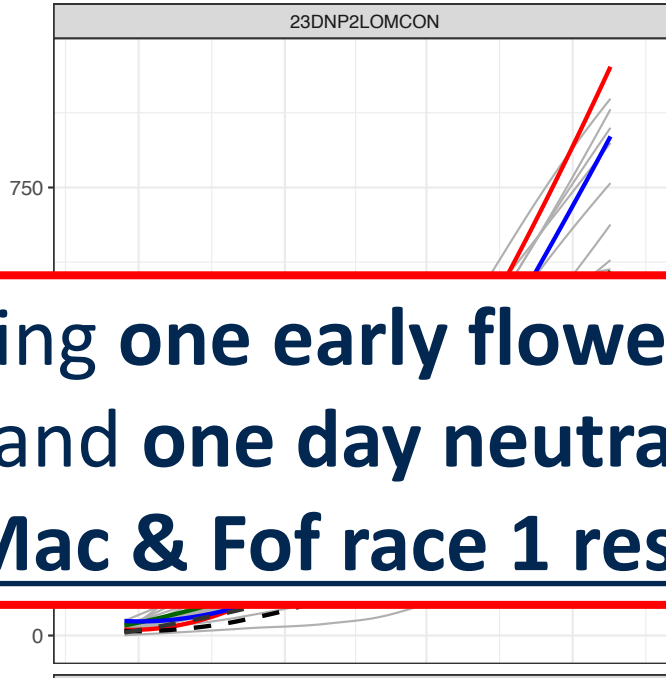
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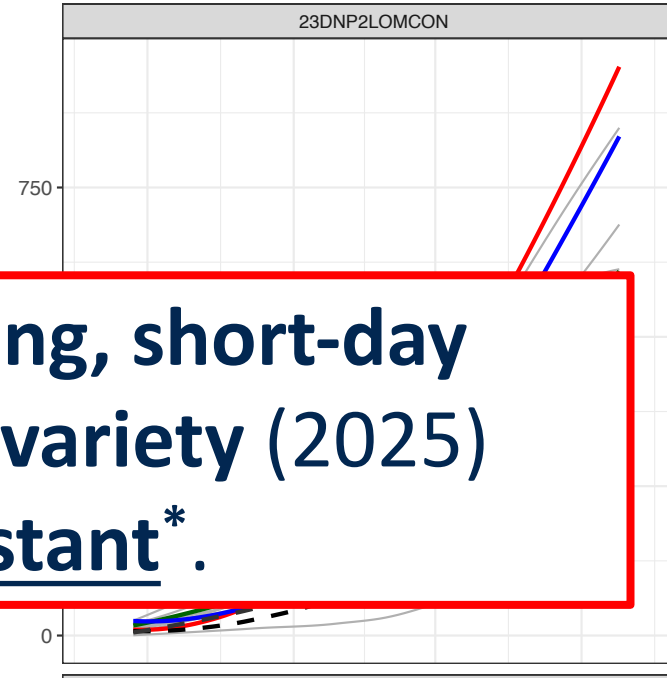
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We are advancing one early flowering, short-day variety (2024) and one day neutral variety (2025) that are both Mac & Fof race 1 resistant\*.

**1**

**2**

**3**

**4**

**5**

Resistant	Susceptible			
Asymptomatic	Symptomatic			Deceased

# Take away

- The five most recent UC varieties are all resistant to *F. oxysporum* Race 1
- 8 of 12 UC varieties since 2015 are resistant-moderately resistant to *Neopestalotiopsis* sp.
- Two varieties resistant to *M. phaseolina* are coming down the pipeline.
- Potential Donors of resistance to *F. oxysporum* Race 2 are being studied in progeny tests\ to confirm their value as donors.