Strawberry Diagnostic Updates from the Cal Poly Strawberry Center

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Strawberry Disease Diagnosis

- We are accepting samples!
- Visit Cal Poly Strawberry Center website to access sample submission form https://strawberry.calpoly.edu/

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Strawberry Disease Information Form

https://strawberry.calpoly.edu

Phytophthora crown rot

- Dispersed by motile zoospores

Phytophthora Zoospore Release

Video by Alison Hawkes

Fusarium wilt

- Caused by *Fusarium oxysporum* f.sp. *fragariae*

- Detection using RPA method (Recombinase Polymerase Amplification)

Plating Results: 3-5 days

RPA Results:1 hour

Tube 1 - X-F
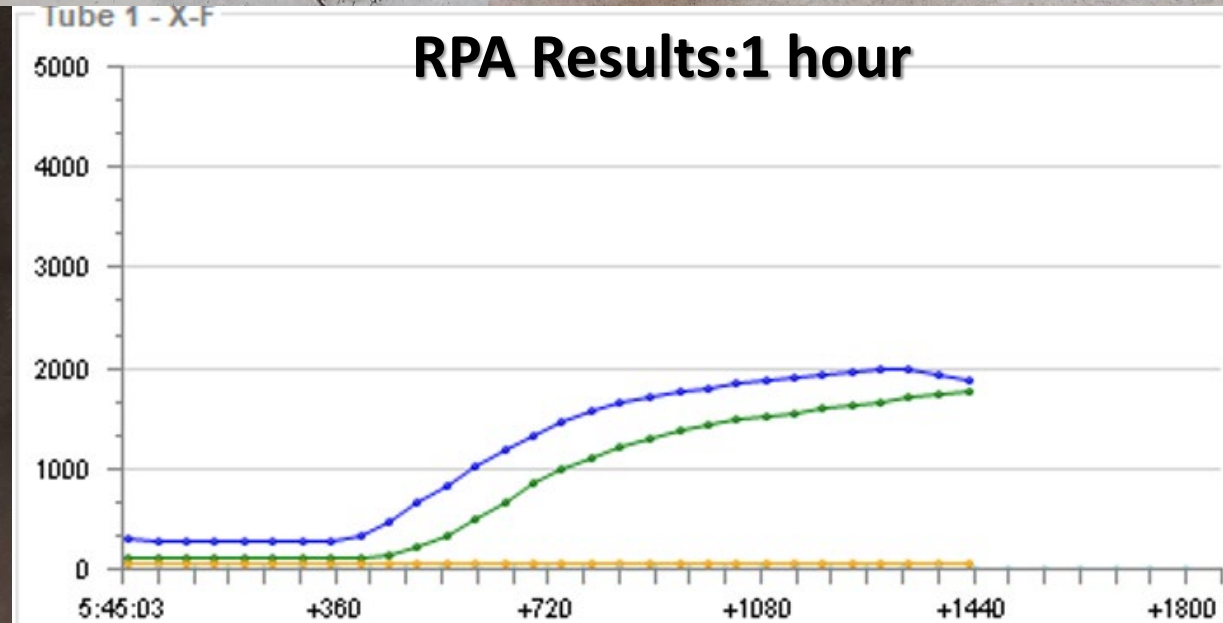
Macrophomina Crown Rot and Verticillium Wilt

- Caused by *Macrophomina phaseolina* and *Verticillium dahliae*
- Detected using traditional plating or RPA method

Macrophomina crown rot
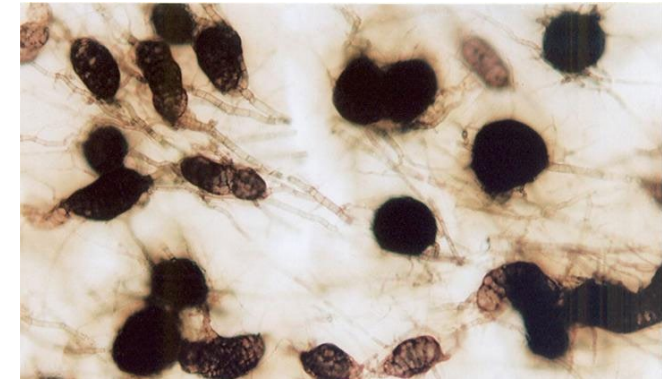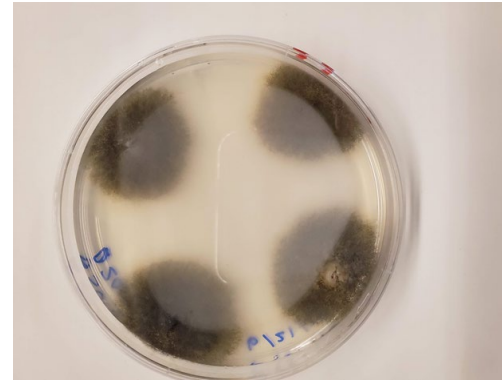
Verticillium wilt

Photo credit: *Gerald Holmes*

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https://projects.ncsu.edu

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LEARN BY DOING
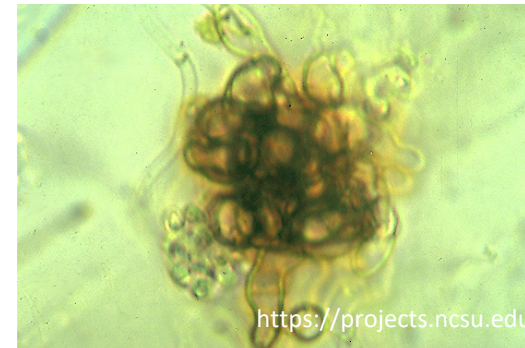
Anthracnose

- Caused by *Colletotrichum acutatum* and *C. gloeosporioides*
- Detected by incubation and quantitative PCR

Microscopy

qPCR

Source: Nan-Yi Wang

Leaf Blotch, Stem-End Rot and Dry Calyx/ Brown Cap

Pathogen: *Gnomonia comari* (sexual stage)
Zythia fragariae (asexual stage)

Photo by Gerald Holmes

100 µm
20 µm
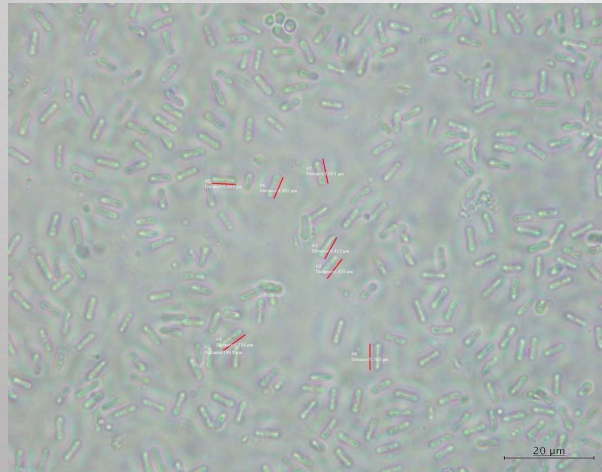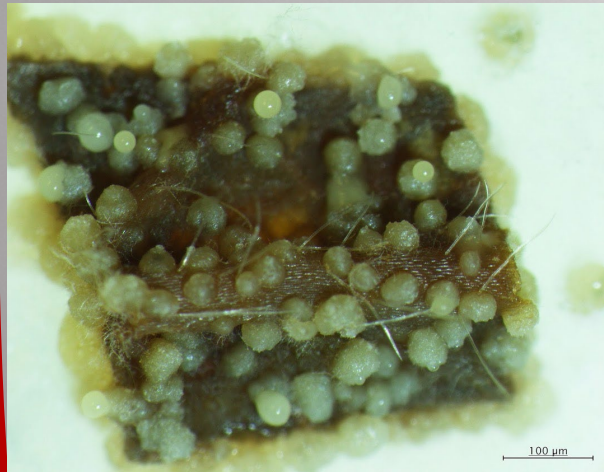
Photo by Gerald Holmes

Comparison of Crown Rot Diseases
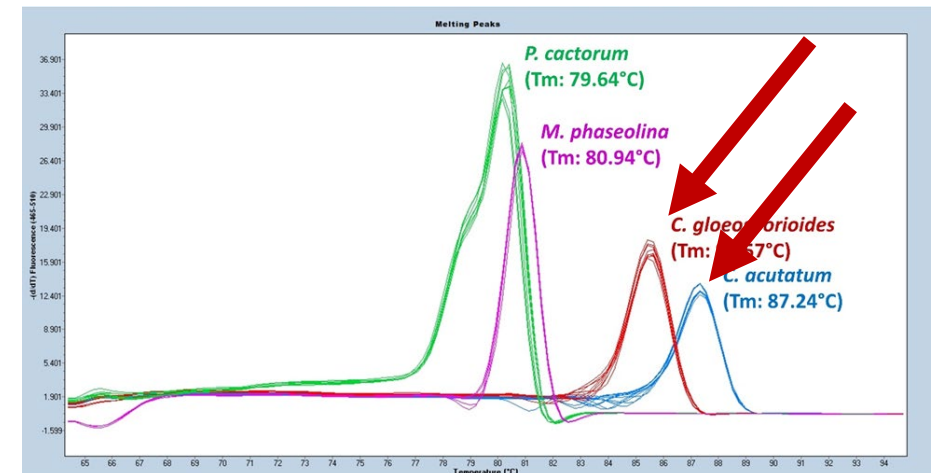
Field Symptoms	Fusarium Wilt	Macrophomina crown rot	Verticillium Wilt	Phytophthora Crown Rot
Poor growth and stunting	Yes	Yes	Yes	Yes
Wilting (older leaves)	Yes	Yes	Yes	No
Wilting (all leaves)	No	No	No	Yes
Plant Collapse & Death	Yes	Yes	Yes	Yes
Discolored crown tissue	Yes	Yes	No	Yes
Soft rotted roots	No	No	No	Yes
Associated with stress factors	Yes	Yes	Yes	No
Dependent on overly wet soils	No	No	No	Yes

Koike and Gordon 2015

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Summary of Diagnostic Service Activity 2020

2020 Submissions (Jan-August)	Number of submissions/samples
Total number of submissions	122
by Strawberry growing districts	
• Santa Maria	81
• Watsonville/Salinas	29
• Ventura/Oxnard	12
by industry type	
• Nursery	1
• Production	121

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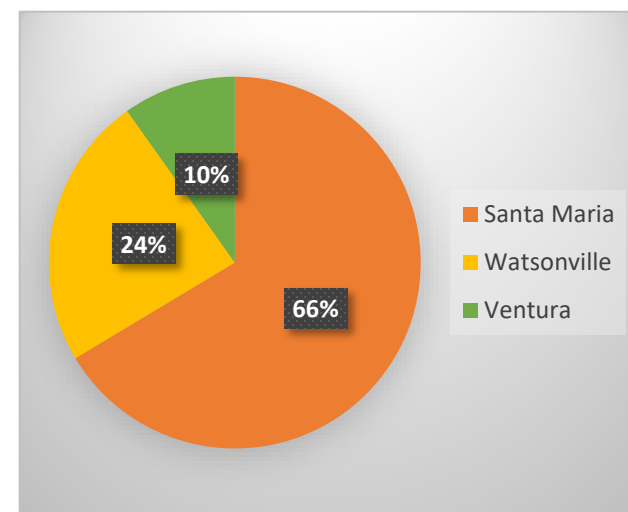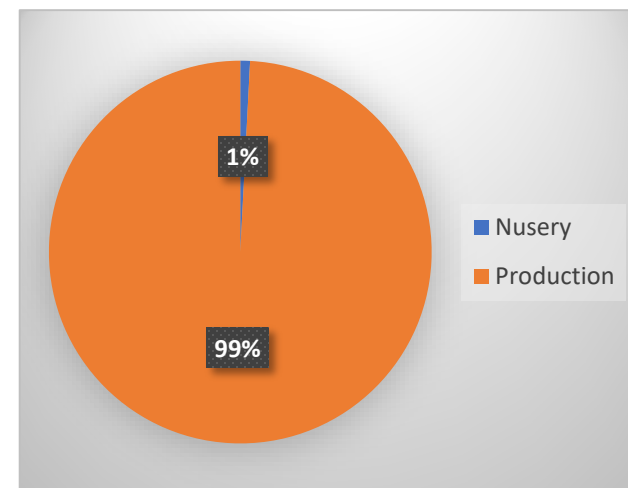
Comparison of Disease Identification with Past Years

Disease/pest/disorder	Number of samples		
	2018	**2019**	**2020**
Abiotic/pest problems	18	38	35
Macrophomina crown rot	2	22	29
Phytophthora crown rot	14	16	9
Fusarium wilt	2	9	22
Verticillium wilt	1	5	17
Zythia dry calyx, leaf blotch, crown infection	0	4	9
Powdery mildew	0	1	0
Anthracnose	0	1	2
Neopestalotiopsis or related spp.	0	0	3
Total number of samples	**33**	**86**	**122**

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A Closer Look at the Santa Maria Samples

Disease/pest/disorder	Number of samples
	2020
Abiotic/pest problems	27
Macrophomina crown rot	23
Verticillium wilt	13
Fusarium wilt	9
Phytophthora crown rot	5
Zythia dry calyx, leaf blotch, crown infection	5
Total number of samples	**81**

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Acknowledgement

- Farm Advisors
- PCAs
- **Strawberry Commission Staff:**
  - Daniel Olivier
  - Ignacio Mendoza
  - Miriam Mendez
- **Lab Technician**
  - Vivian Longacre
- **Cal Poly Undergraduates:**
  - Angela Cruz
  - Lauren Tallichet
  - Shae Tobin
  - Joseph Donohue

SAVE THE DATE!

- Cal Poly Strawberry Center Virtual Field Day 2020
- Tuesday, August 25, 2020

Questions

- **Which one is the correct statement on disease diagnosis?**
    a.   You can determine the disease by looking at a discolored crown.
    b.   The plant death is always caused by a disease.
    c.   Diagnosis is based on the representative sample you send to us.
    d.   Traditional diagnostic techniques are very quick.

- **Which of the following diseases were most prevalent in Santa Maria this year so far based on the samples submitted to our clinic?**
    a.   Macrophomina crown rot and Verticillium wilt
    b.   Fusarium wilt and Macrophomina crown rot
    c.   Verticillium wilt and Phytophthora crown rot
    d.   Phytophthora crown rot and anthracnose

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