

Trunk Renewal for Management of Trunk Diseases



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CANKER



BLACK SPOTS



DECAY

Chronic wood infections:

- Pathogens are wood-infecting fungi.
- Infections are localized near entry point (wound).
- Discolored wood is not visible on bark surface.
- Spores form on bark surface.
- Prevention is the best approach.



Botryosphaeria dieback



Phomopsis dieback



Eutypa dieback

DIEBACK-TYPE TRUNK DISEASES:

- **DEAD FRUITING POSITIONS**
 - YIELD LOSS
 - DECLINE IN VINE VIGOR
- **AS WOOD INFECTION DEVELOPS, LEAVES ARE ASYMPTOMATIC FOR MONTHS TO YEARS**
- **SYMPTOMS FIRST APPEAR IN YEARS 6 TO 8**

ESCA



08/16/2022 SAUVIGNON
BLANC HEALDSBURG, CA

IMPACTS:

- **IMPROPER RIPENING**
- **FRUIT SPOTS ('MEASLES')**
- **+/- DECLINE IN VINE VIGOR**
- **SYMPTOMS FIRST APPEAR IN YEARS 4 TO 6 (ALTHOUGH INFECTIONS HAPPEN YEARS BEFORE)**



SCOUTING:

WHY?

- **COLLECT SAMPLES FOR DISEASE DIAGNOSIS DURING GROWING SEASON.**
- **SPRAY ONCE IN DORMANT SEASON.**
- **EFFECTS OF SPRAYS ARE SEEN YEARS LATER.**



SCOUTING:

WHAT?

- **LEAF SYMPTOMS**
- **SHOOT DIEBACK**
- **DEAD SPURS**

WHEN?

- **BUDBREAK TO BLOOM
(DIEBACK-TYPE
DISEASES)**
- **VERAISON TO HARVEST
(ESCA)**

ESCA – VERAISON TO HARVEST



07/04/2012
SAUVIGNON BLANC
VILLENEUVE D'ORNON,
FRANCE

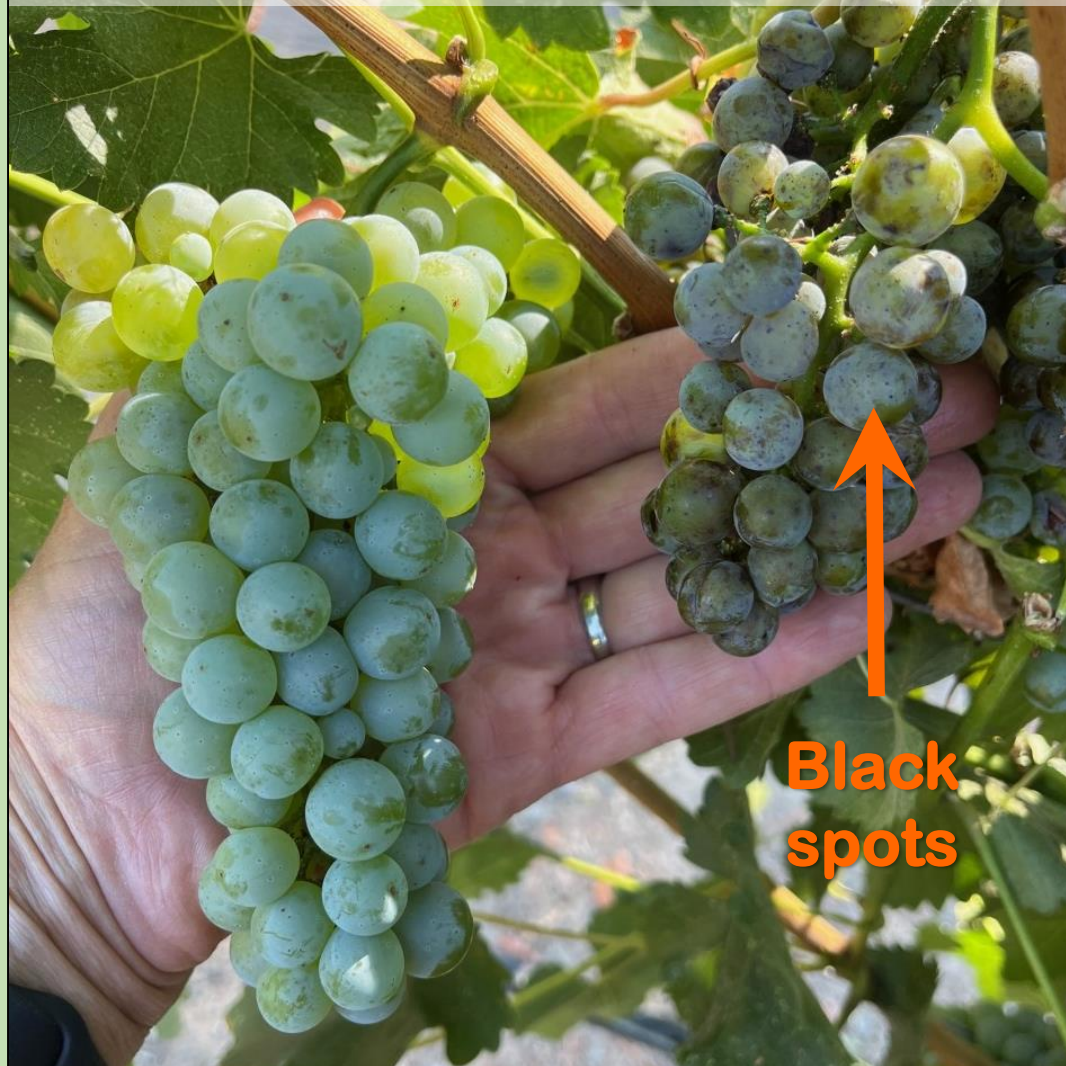


08/23/2018
GRENACHE
ALDERDALE, WA



10/23/2018
CHARDONNAY
HEALDSBURG, CA

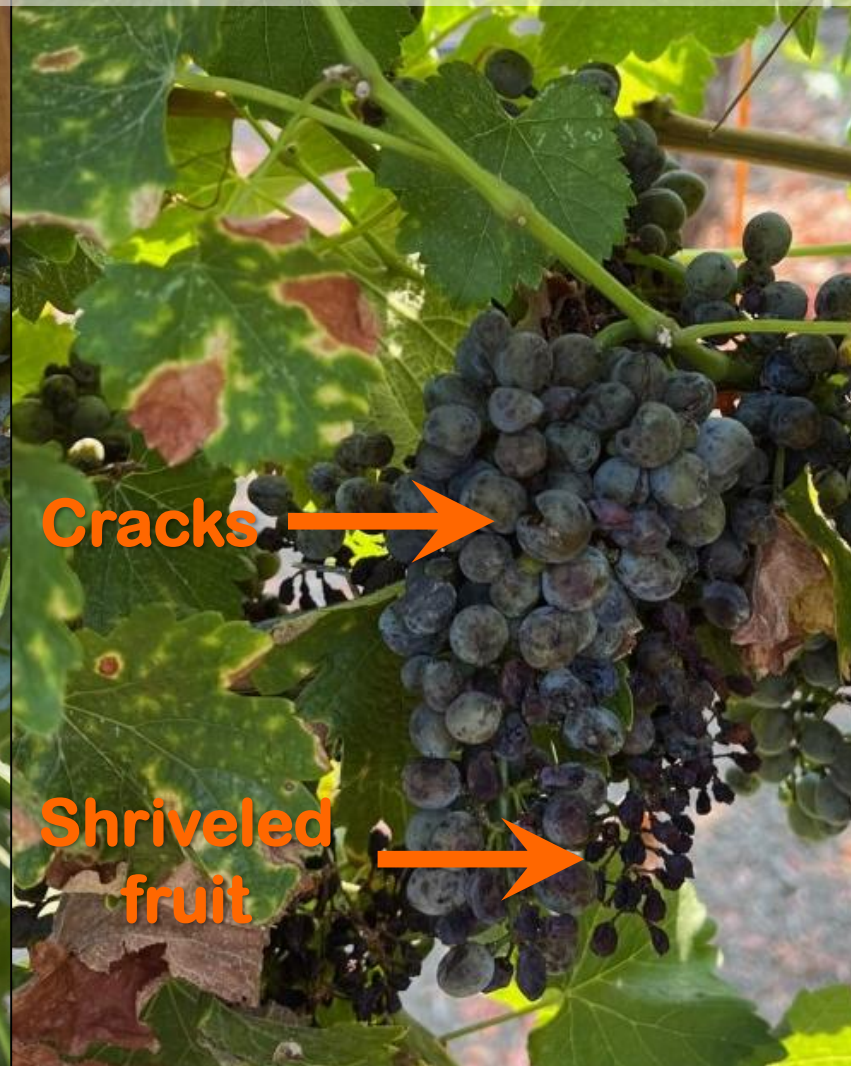
ESCA – VERAISON TO HARVEST



Black spots

08/21/2022

SAUVIGNON BLANC
KELSEYVILLE, CA



Cracks

Shriveled fruit

09/09/2022

SAUVIGNON BLANC
KELSEYVILLE, CA



Grape metabolism is different
in symptomatic fruit:

- **Higher concentrations of phenolic compounds (flavan-3-ols) catechin and epicatechin**
- **May be a defense response (phenylpropanoid pathway)**
- **Compounds may inhibit fungal enzyme activity**

Grape metabolism is different
in symptomatic fruit:

- **Lower concentrations of monoterpenes and tannins**
- **Lower TSS**
- **Higher TA**
- **May be a delay in ripening**



Chemical composition of healthy fruit on a symptomatic vine is similar to that of healthy fruit on a healthy vine.

Selective harvest may be an option to drop symptomatic fruit, but to retain healthy fruit.



ESCA - WOOD SYMPTOMS



BLACK SPOTS (IN CROSS SECTION)



DECAY



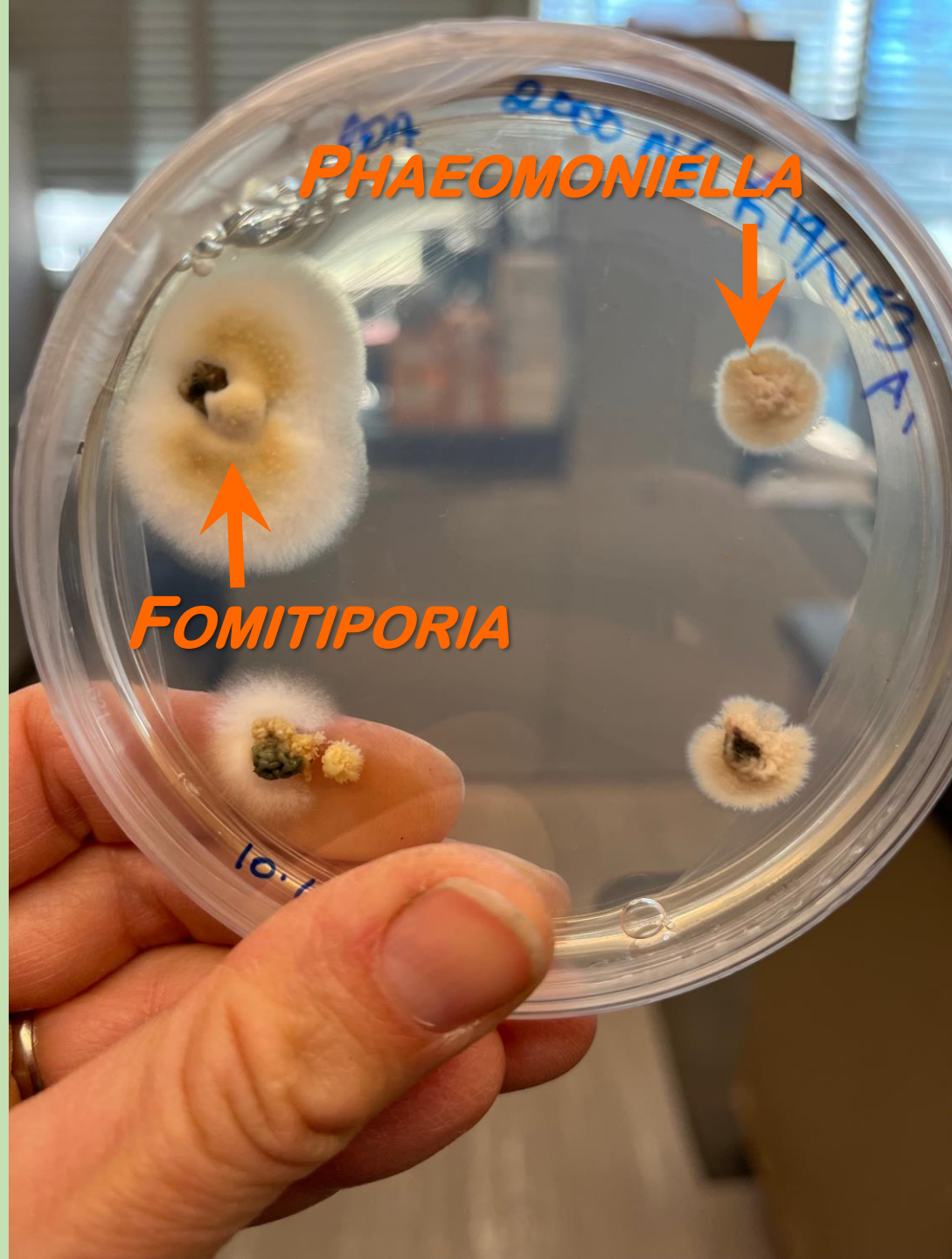
BLACK LINES (IN LONGITUDINAL SECTION)

ESCA

RAPID VINE COLLAPSE OR 'APOPLEXY'



07/24/2017 CABERNET-
SAUVIGNON LODI, CA



MIXED INFECTIONS

- Three different pathogens can cause Esca
- Found in various combinations
- Different pruning wounds are infected by different pathogens in different years

DISEASE SPREAD

SPORES ARE PRODUCED WITH RAIN

- **SPREAD BY RAIN OR WIND.**
- **ORIGINATE FROM GRAPEVINES AND/OR NURSERY STOCK.**

PRUNING-WOUND SUSCEPTIBILITY:

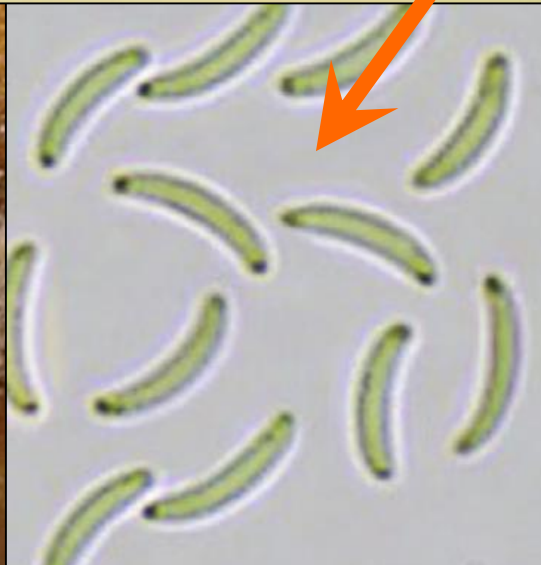
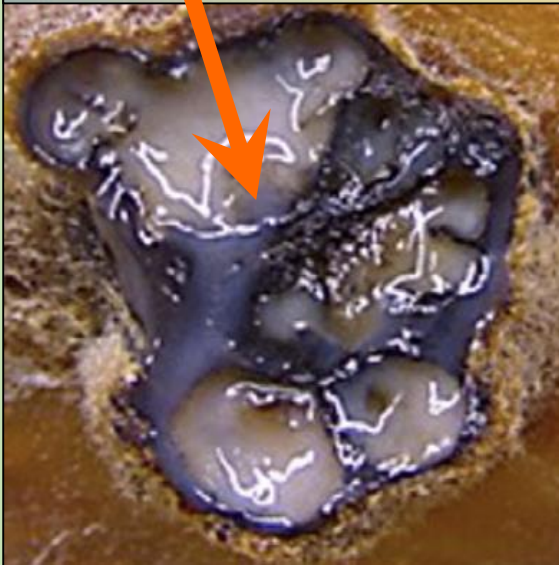
- **LASTS FOR WEEKS THROUGHOUT THE DORMANT SEASON**

**Fungal
fruiting
bodies**



**Sticky
spores are
produced
with rain**

**Rain splash
spreads the
sticky spores**





02/11/2021

AUTUMN KING

EARLHAM, CA

TRUNK RENEWAL

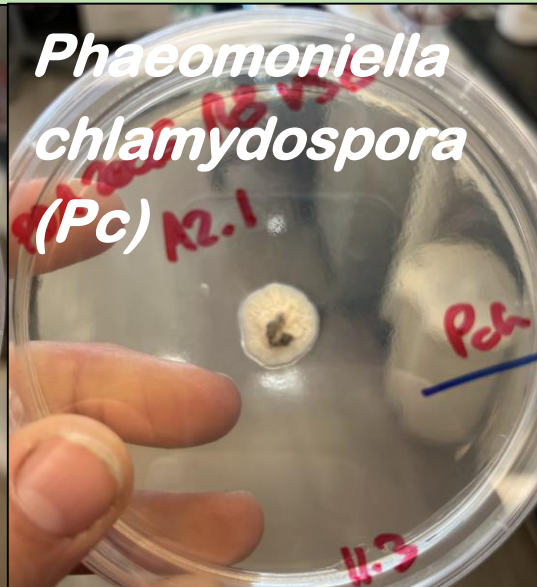
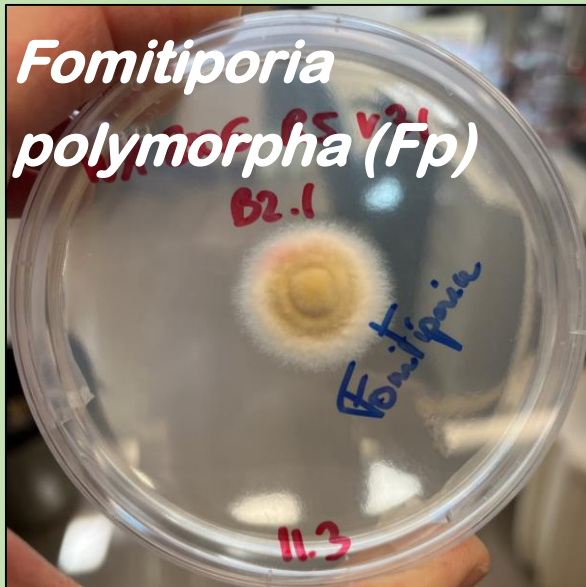
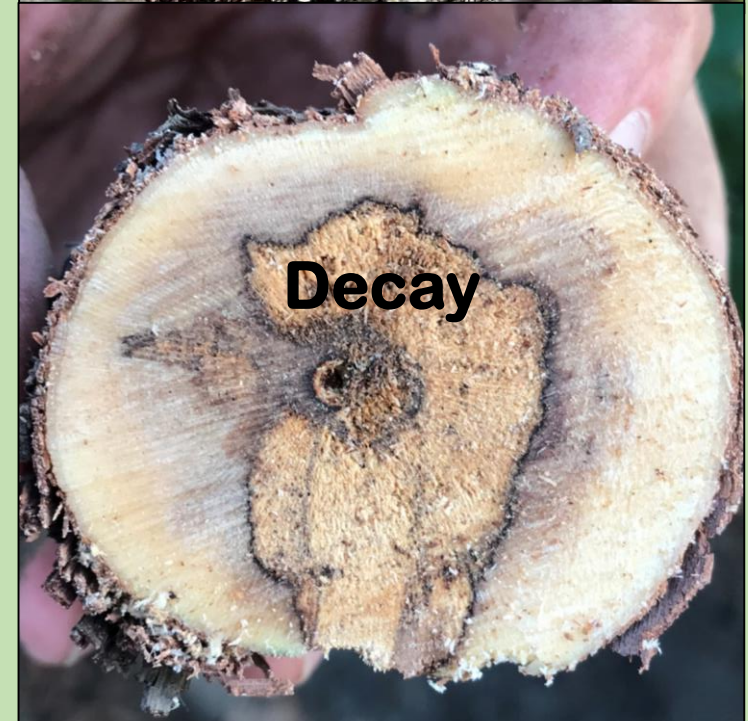
- **Flag symptomatic vines in Summer 2017, when symptoms are visible ($n = 97$ vines)**
- **‘Decapitate’ symptomatic vines in Winter 2018, after pruning**
- **Do this in dry weather & treat wound with fungicide**



02/19/2018
SAUVIGNON BLANC
KELSEYVILLE, CA

IS THE BASE OF THE TRUNK INFECTED?

- Presence/absence of wood symptoms:
 - Black spots
 - Rotted wood
- Culture attempts for Esca pathogens:
 - *Fomitiporia polymorpha* (Fp)
 - *Phaeomoniella chlamydospora* (Pc)
 - *Phaeoacremonium minimum* (Pm)



TRUNK RENEWAL

- **Retrain a new canopy from presumably healthy wood at base of the trunk.**
- **Utilize fully developed root system to retrain canopy**
- **Cost effective, if done before year 15**



10/02/2018
SAUVIGNON BLANC
KELSEYVILLE, CA

TRUNK RENEWAL

**Fate of 97 retrained vines in
2022:**

Healthy-retrained – 72

Replanted – 24

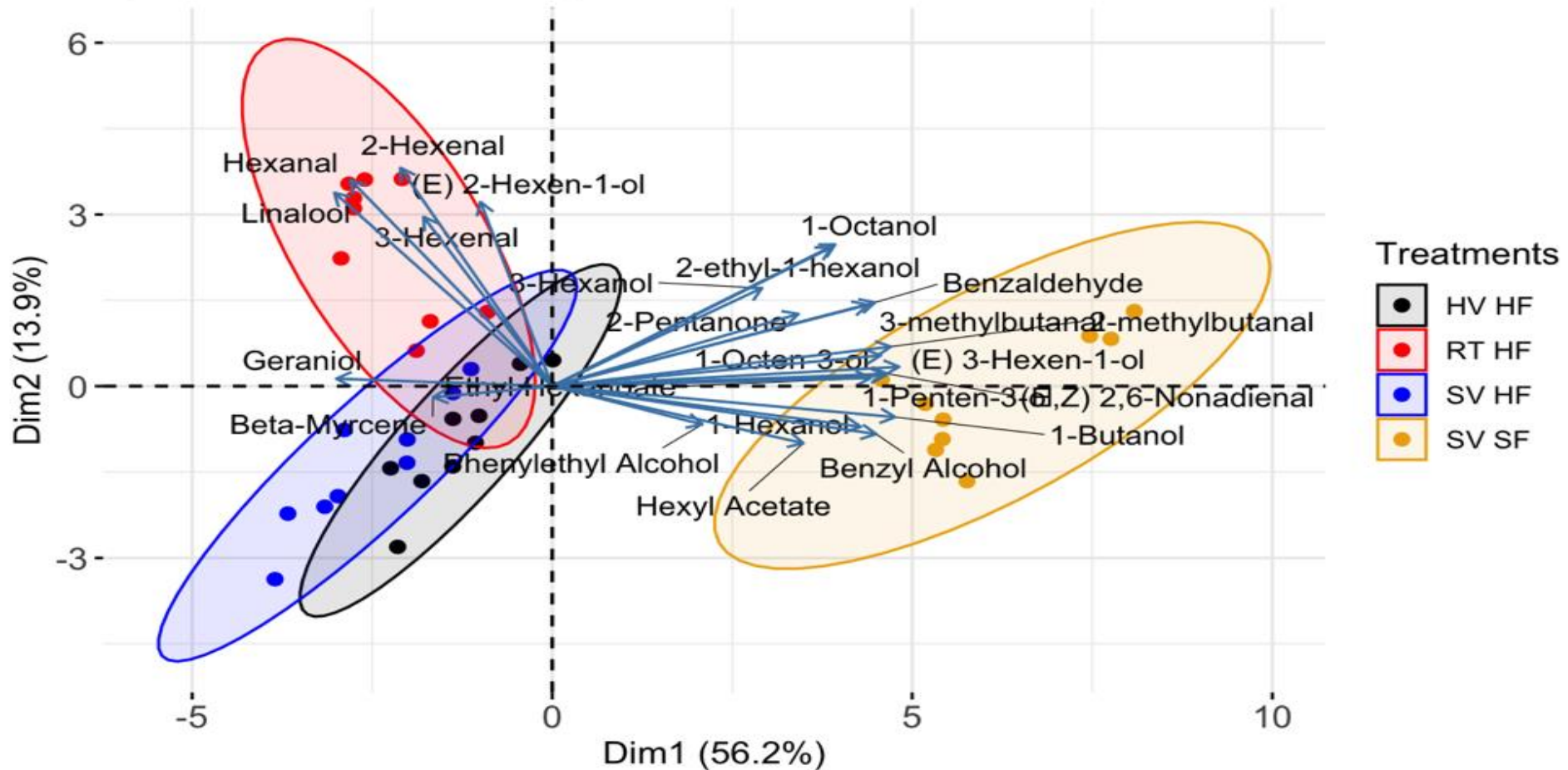
Symptomatic-retrained – 1



08/13/2020

**SAUVIGNON BLANC
KELSEYVILLE, CA**

a) Volatile Profile of Grapes in Southwest Block



Ziploc
BRAND MAGIQUE
2000 SE
R19V03a

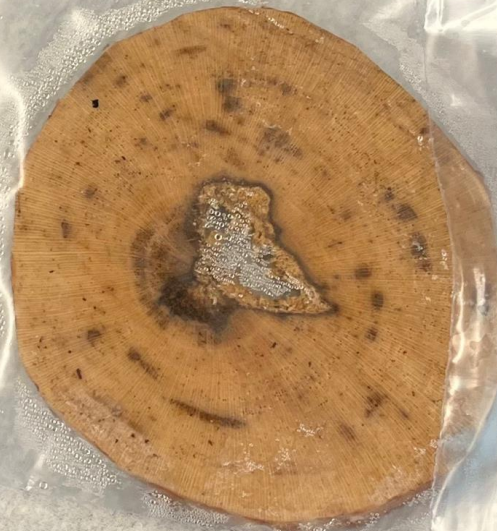
TOP

Ziploc
BRAND MAGIQUE
2000 SE
R19V03b

CENTER

Ziploc
BRAND MAGIQUE
2000 SE
R19V03c

BASE

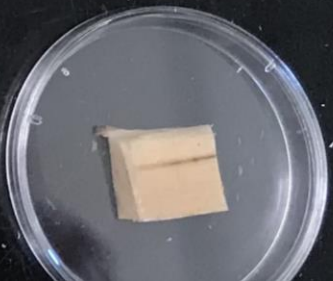
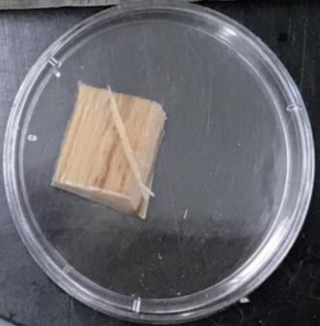


New DNA-based method (qPCR) is more sensitive

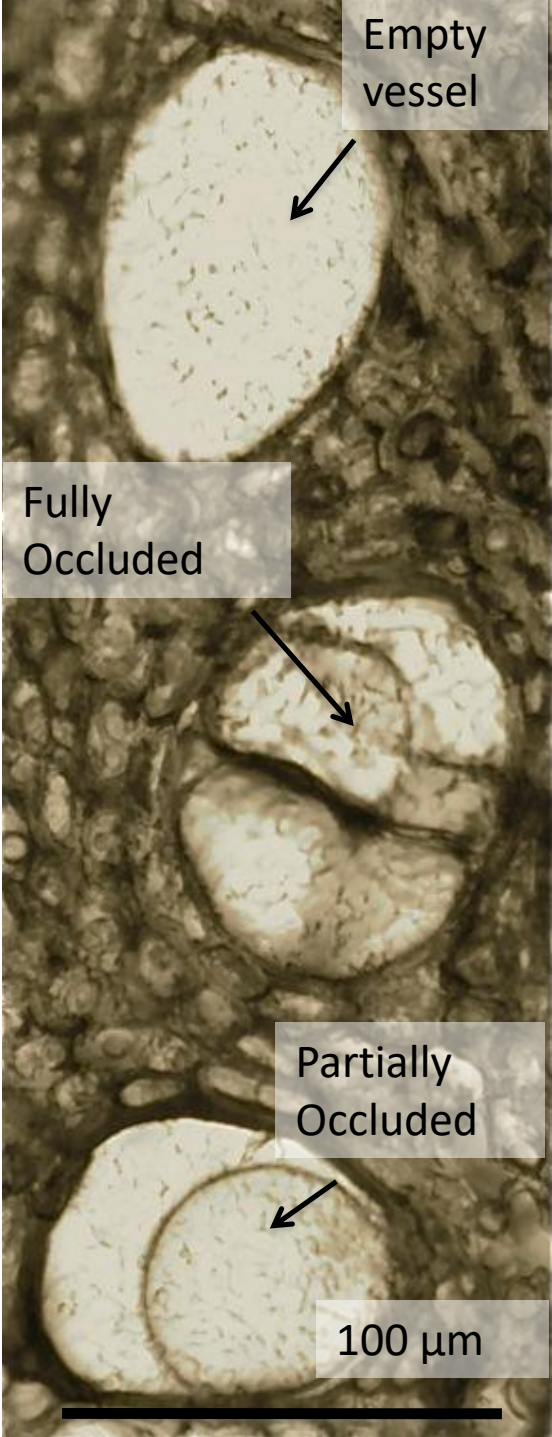
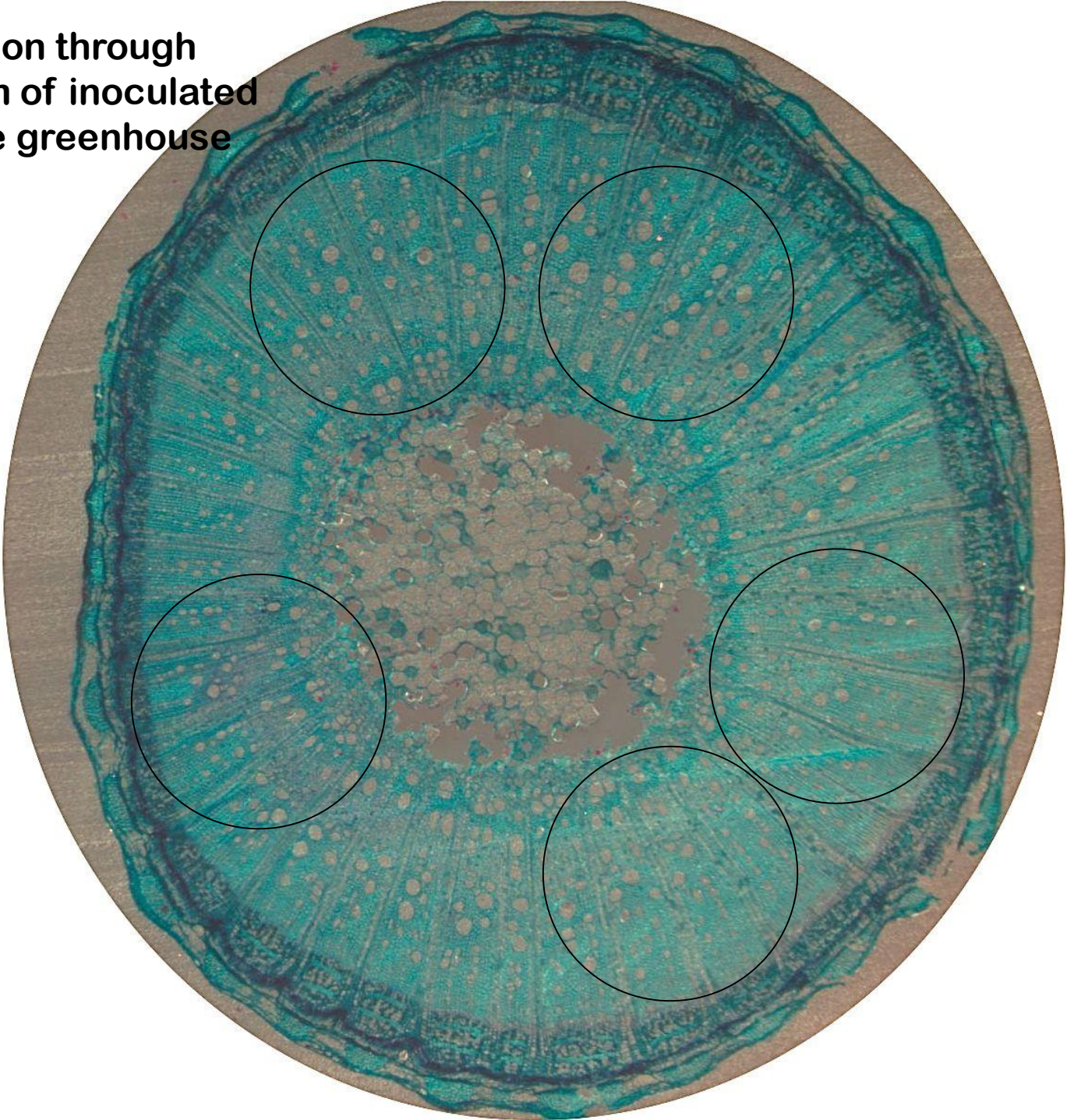
		DNA-based detection (qPCR)		Culture-based detection	
Vine	Trunk location	<i>Pc</i>	<i>Pm</i>	<i>Pc</i>	<i>Pm</i>
15	Top	1	0	1	0
	Center	1	0	0	0
	Base	1	0	0	0
53	Top	1	0	1	0
	Center	1	0	0	0
	Base	1	0	1	0
63	Top	1	0	0	0
	Center	0	0	0	0
	Base	0	0	0	0
80	Top	1	1	1	0
	Center	1	0	0	0
	Base	1	0	0	0

New DNA-based method (qPCR) is more sensitive

		DNA-based detection (qPCR)		Culture-based detection	
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	Base	1	0	1	0
63	Top	1	0	0	0
	Center	0	0	0	0
	Base	0	0	0	0
80	Top	1	1	1	0
	Center	1	0	0	0
	Base	1	0	0	0



Cross-section through woody stem of inoculated plant, in the greenhouse



Empty vessel

Fully Occluded

Partially Occluded

100 μm

Renovación del tronco para el manejo de las enfermedades de la madera de la vid

#1 Reconozca los síntomas y marque las vides

Entre la brotación y el cuajado de la fruta



MUERTE REGRESIVA



EUTIPIOSIS



EXCORIOSIS

Entre que la fruta toma color y la cosecha

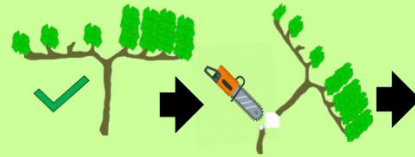


YESCA

#2 Corte las vides marcadas arriba de la unión del injerto en el verano, cuando la herida se curará rápidamente.

#3 Proteja la madera*

#4 Renueve la vid

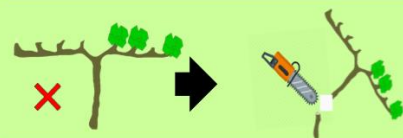


Vides con síntomas moderados deberían tener troncos sanos para renovación.



Renovación rutinaria de vides con síntomas moderados puede aumentar productividad.

Importante para notar: No resultará una vid sana de madera enferma



Vides con síntomas graves pueden tener troncos enfermos que no merecen ser renovados.



No espere hasta que los síntomas sean graves.

