CLEMSON UNIVERSITY

Summer Diseases of Peach

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Fruit Rots of Peach

Common

- Brown rot

Uncommon

- Anthracnose fruit rot
- Alternaria fruit rot
- Rhizopus rot
- Gilbertella rot
- Phomopsis
- Phoma
- Botryospheria
- Botrytis fruit rot

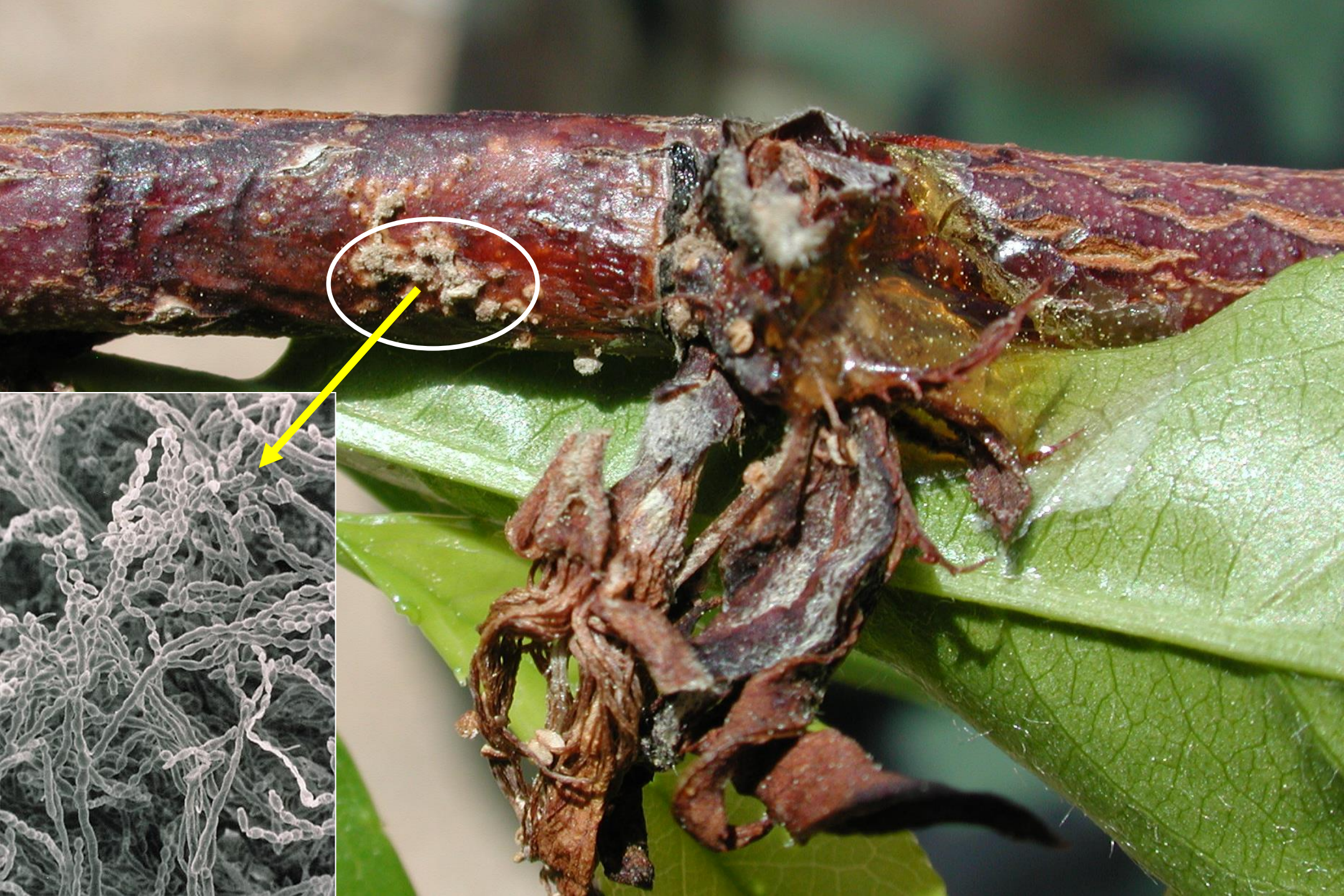
Brown rot

-*Monilinia fructicola*

-*M. laxa* (blossom blight

-*M. fructigena* (Europe)

-other Monilinia species (Europe and Asia)




Blossom blight

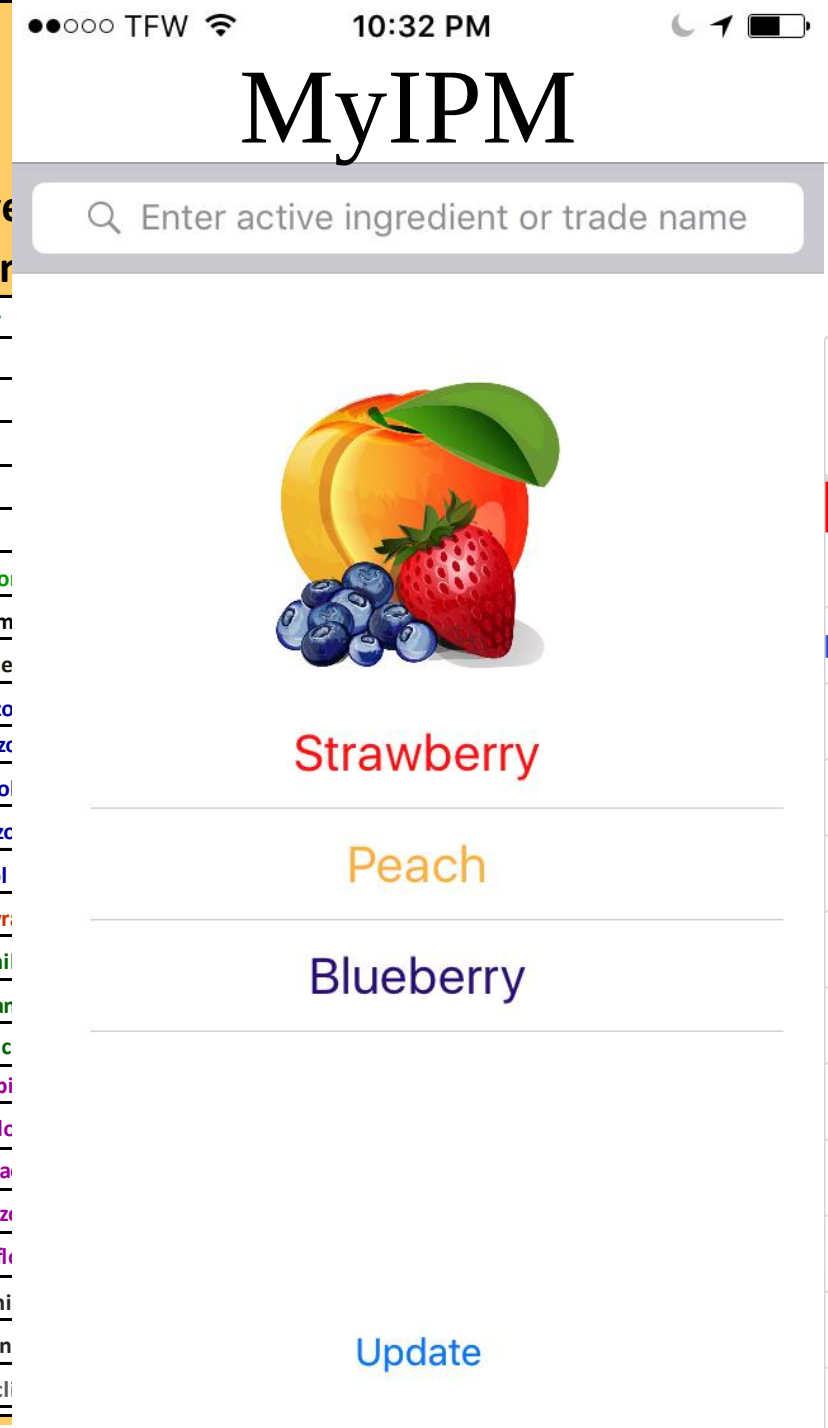
Sanitation Practices

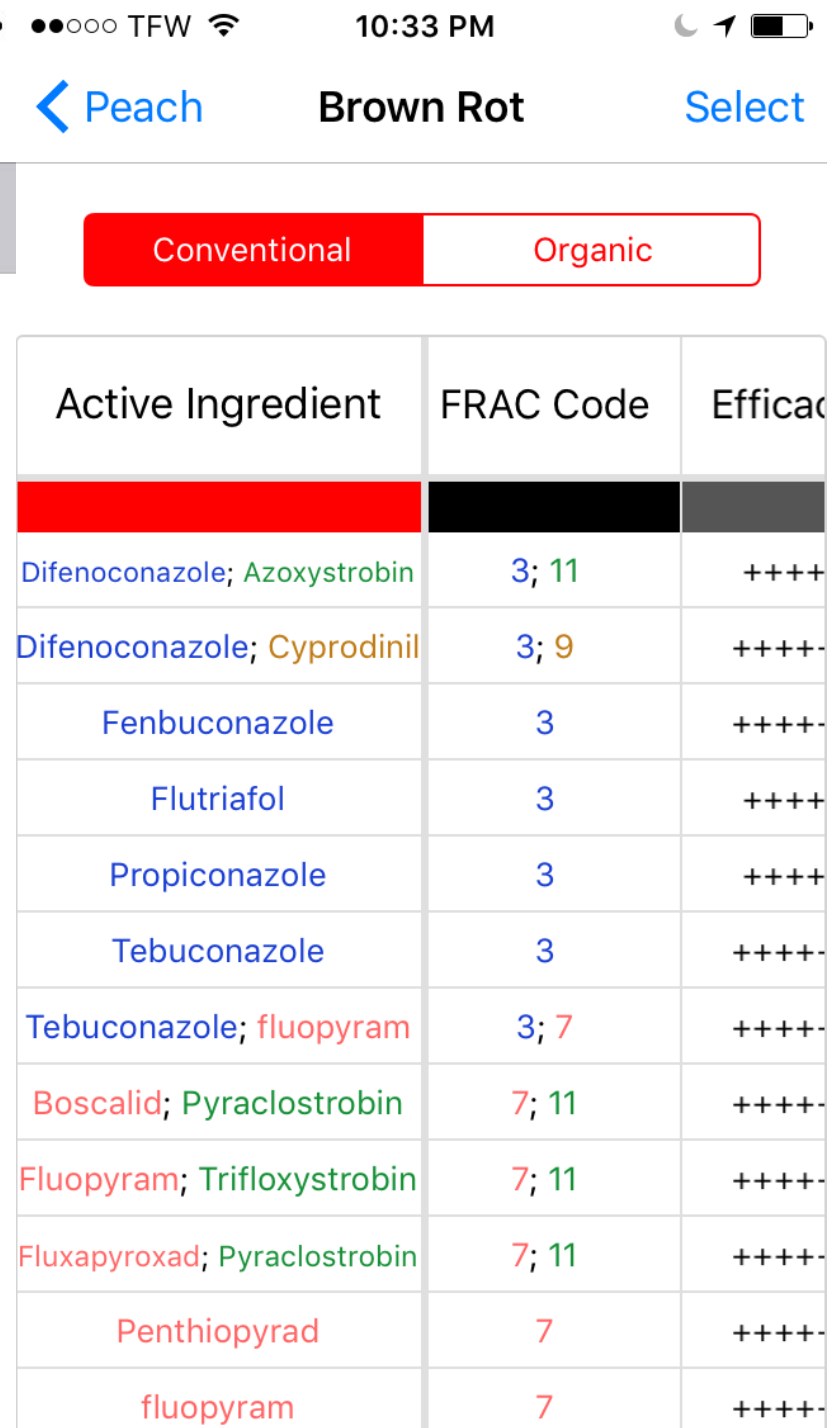
- Remove mummies and cankers
- Eliminate wild plum species
- Keep herbicide strip clear of weeds
- Keep sod middle short all year (less sexual reproduction in spring)

Control Strategies

- reduce inoculum sources
- bloom applications of fungicides
- preharvest applications of fungicides –NOT OPTIONAL-
- postharvest applications of fungicides
  - When needed (mid to late season)

Fungicide	Active Ingredier
Coppers	copper
Sulfur	sulfur
Ferbam	ferbam
Thiram	thiram
Ziram	ziram
Captan	captan
Bravo, other	chlorothalo
Topsin M, other	thiophanate-m
Rovral, other	iprodione
Elite, other	tebuconazo
Indar	fenbuconazo
Quash	metconazol
Tilt, other	propiconazo
Topguard	flutriafol
Fontelis	penthiopyr
Scala	cyprodinil
Vangard	pyrimethan
Inspire Super	difenoconazole + c
Abound, other	azosystrobi
Pristine	boscalid + pyraclo
Merivon	fluxopyroxad + pyra
Quadris Top	difenoconazole + az
Adament	tebuconazole + trifl
Scholar	fludioxoni
Botran	dichloran
Mycoshield/FireLine	oxytetracycli





Active Ingredient	FRAC Code	Effica
Difenoconazole; Azoxystrobin	3; 11	++++
Difenoconazole; Cyprodinil	3; 9	++++-
Fenbuconazole	3	++++-
Flutriafol	3	++++
Propiconazole	3	++++
Tebuconazole	3	++++-
Tebuconazole; fluopyram	3; 7	++++-
Boscalid; Pyraclostrobin	7; 11	++++-
Fluopyram; Trifloxystrobin	7; 11	++++-
Fluxapyroxad; Pyraclostrobin	7; 11	++++-
Penthiopyrad	7	++++-
fluopyram	7	++++-

Blossom Blight
– do not use heavy artillery (FRAC 3 and 7/11)

- FRAC 1, 2, 9
  - Topsin (4+) with protectant
  - Rovral 2F high rate (4+) with protectant
  - Vangard (4+)
  - Protectants: Captan (2+), Bravo (3+)

Cover Sprays – Prevent Green Fruit Rot and Inoculum Build-Up

- Goal: Prevent green fruit rot
- Sulfur or Captan?
  - Cost (material vs. application intervals)
  - efficacy (other diseases)
  - Other effects (sulfur tox at >80F; captan red blush but inking potential)

Preharvest Sprays – The Key to Success

- Use the most effective products
- consider fungicide resistance issues
- follow label recommendations

Preharvest Spray Options

Solo products

- FRAC 3
  - (Tilt, Indar, Tebucon)
- FRAC 7
  - Fontelis; Luna Privilege
- FRAC 11
  - Abound, Gem and Generics

Premixtures

- FRAC 7 + 11
  - Pristine, Merivon, Luna Sensation
- FRAC 3 + 11
  - Quadris Top

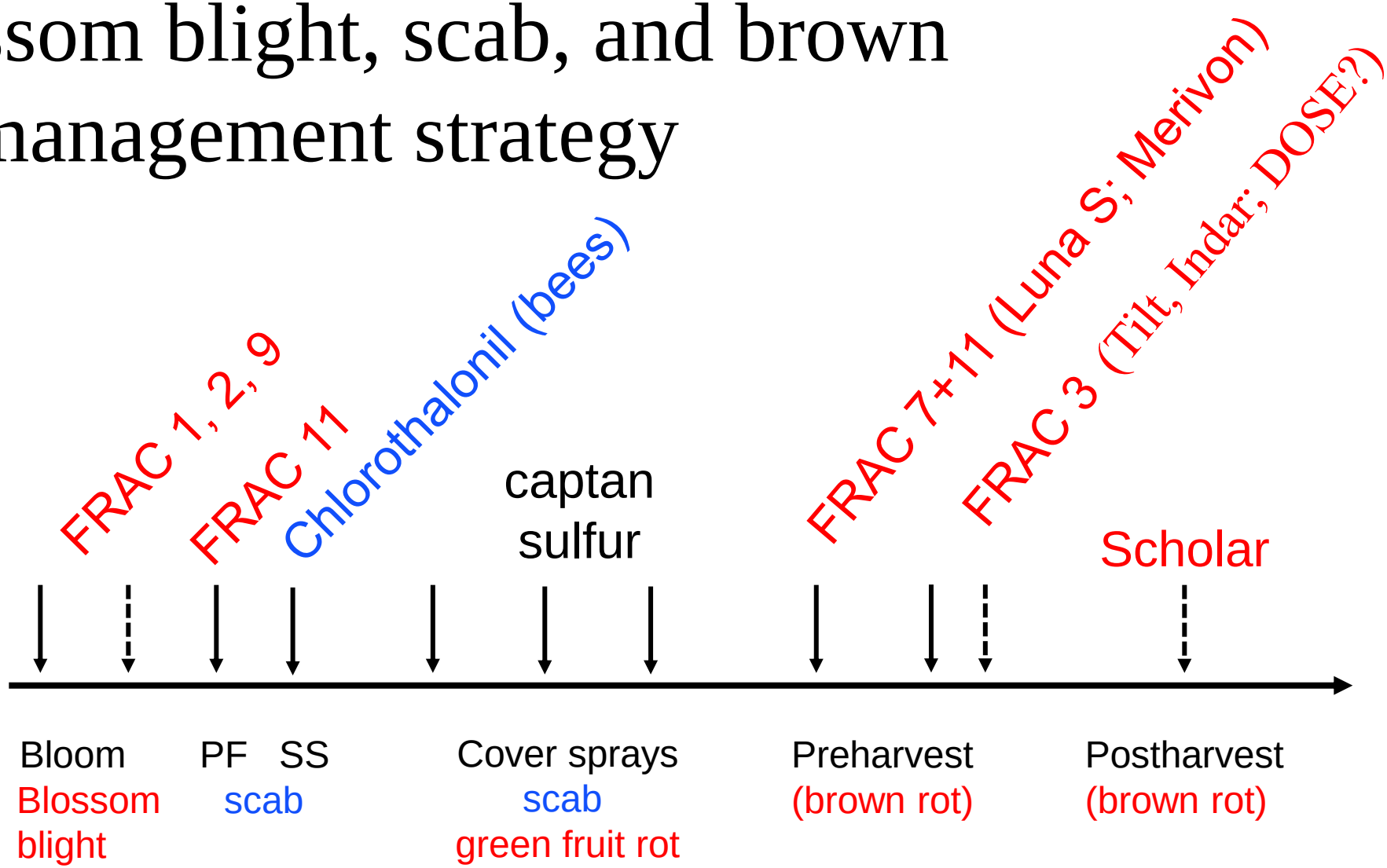
What to use early?

Fungicide & Rate/A[1/]	Spray Schedule[2/]			Mean % brown rot diseased fruit on & under tree[3/] 22 Jun	Mean % brown rot diseased fruit after 6 days storage[4/] 24 Jun
	2 Jun	9 Jun	16 Jun		
1 – Non-treated				68 a	59 a
2 – Merivon 500SC 6.0 fl oz	X			6 c	10 b
3 – Merivon 500SC 6.0 fl oz		X		10 c	3 b
4 – Merivon 500SC 6.0 fl oz			X	33 b	9 b
5 – Merivon 500SC 4.0 fl oz Bumper 3,6EC 4.0 fl oz	X X		X	14 c	4 b
6 – Merivon 500SC 4.0 fl oz Bumper 3.6EC 4.0 fl oz	X	X	X	13 c	2 b
FLSD α = 0.05				19.0	20.7
Probability > F				0.0001	0.0001

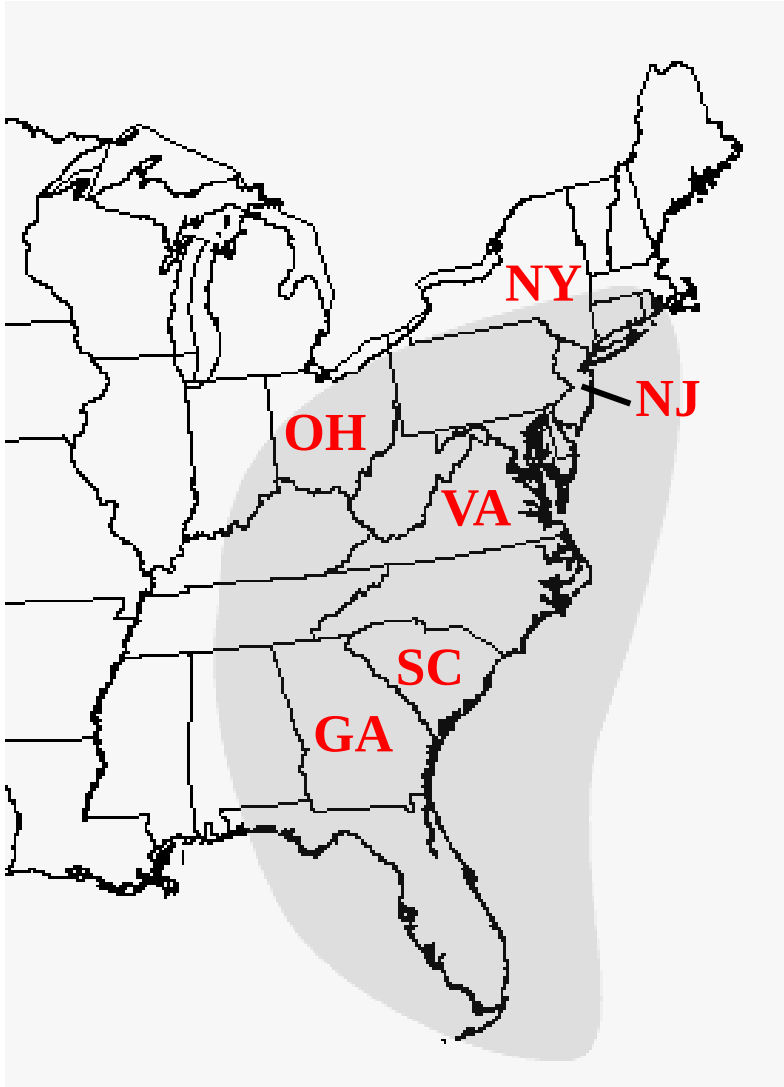
1/ Based on use of 100 gal of spray mixture/acre.
2/ 27 May, 4 fruit/tree were inoculated *M. fructicola* cultured on peach fruit.
3/ Means from 4 single-tree reps.
4/ 18 Jun, 17 fruit per rep were harvested and placed in storage (68-72F).

	Musser Farm trial 2016				
			Brown rot incidence (%)		
Treatment	Rate/A	Timing	Pre-harvest	3 dph	7 dph
Merivon	6.7 fl oz	1, 2, 3	0.0 b	1.5 ab	4.0 c
Merivon	6.7 fl oz	1	0.5 b	3.5 ab	4.0 c
Luna Sensation	7.6 fl oz	1	0.0 b	0.5 b	5.5 c
Luna Sensation	7.6 fl oz	1, 2, 3	0.5 b	1.5 ab	5.5 c
IL-54111 SC	11 fl oz	1, 2, 3	0.0 b	1.5 ab	5.5 c
IL-54111 SC	13.5 fl oz	1, 2, 3	0.5 b	2.0 ab	6.0 c
OSO 5%SC	6.5 floz	1, 2, 3	2.0 b	1.5 ab	8.5 bc
+ Induce	0.13%				
IL-54111 SC	15.5 fl oz	1, 2, 3	1.0 b	2.0 ab	10.0 bc
CX-10370 (iron soap)	1%	1, 2, 3	4.0 b	6.0 ab	26.0 abc
CX-10370 (iron soap)	2%	1, 2, 3	1.5 b	9.5 ab	30.0 abc
CX-10370 (iron soap)	0.50%	1, 2, 3	3.0 b	11.0 ab	39.0 ab
Unsprayed	-	-	9.5 a	14.5 a	48.0 a

Blossom blight, scab, and brown rot management strategy



Resistance to FRAC 3 was Detected in GA, SC, VA, OH, NJ and NY



High Rates of Indar and Tebucon Control DMI Resistant Populations

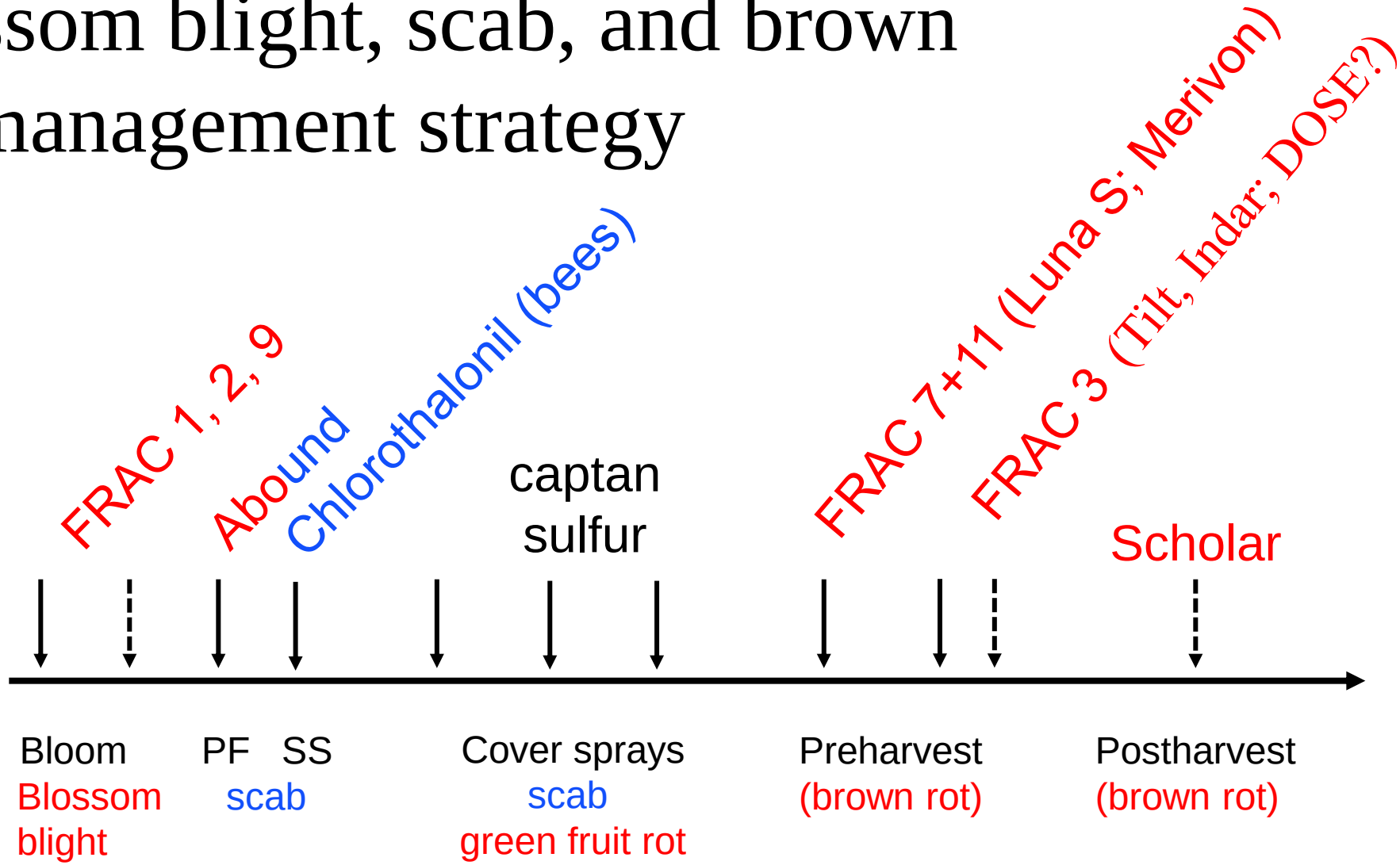
	Brown rot incidence* (% symptomatic fruit)	
Treatment and rate/A	4 days after harvest	7 days after harvest
Untreated Control	34.6 a	79.9 a
Indar 75WSP 2 oz (two applications)	13.7 ab	55.6 ab
Indar 75WSP 3 oz (two applications)	16.7 ab	35.5 bc
Indar 75WSP 4 oz (two applications)	1.3 b	14.1 c
Pristine 38WG 14.5 oz (two applications)	1.3 b	9.8 c

* Means followed by the same letter within each column are not significantly different according to Fisher's protected LSD test ($\alpha = 0.05$). Analysis is based upon square-root-transformed data, but back-transformed data are shown for better interpretation.

Brannen et al. 2006. PDMR. STF001.

Clemson University
Fungicide Resistance Profiling Service

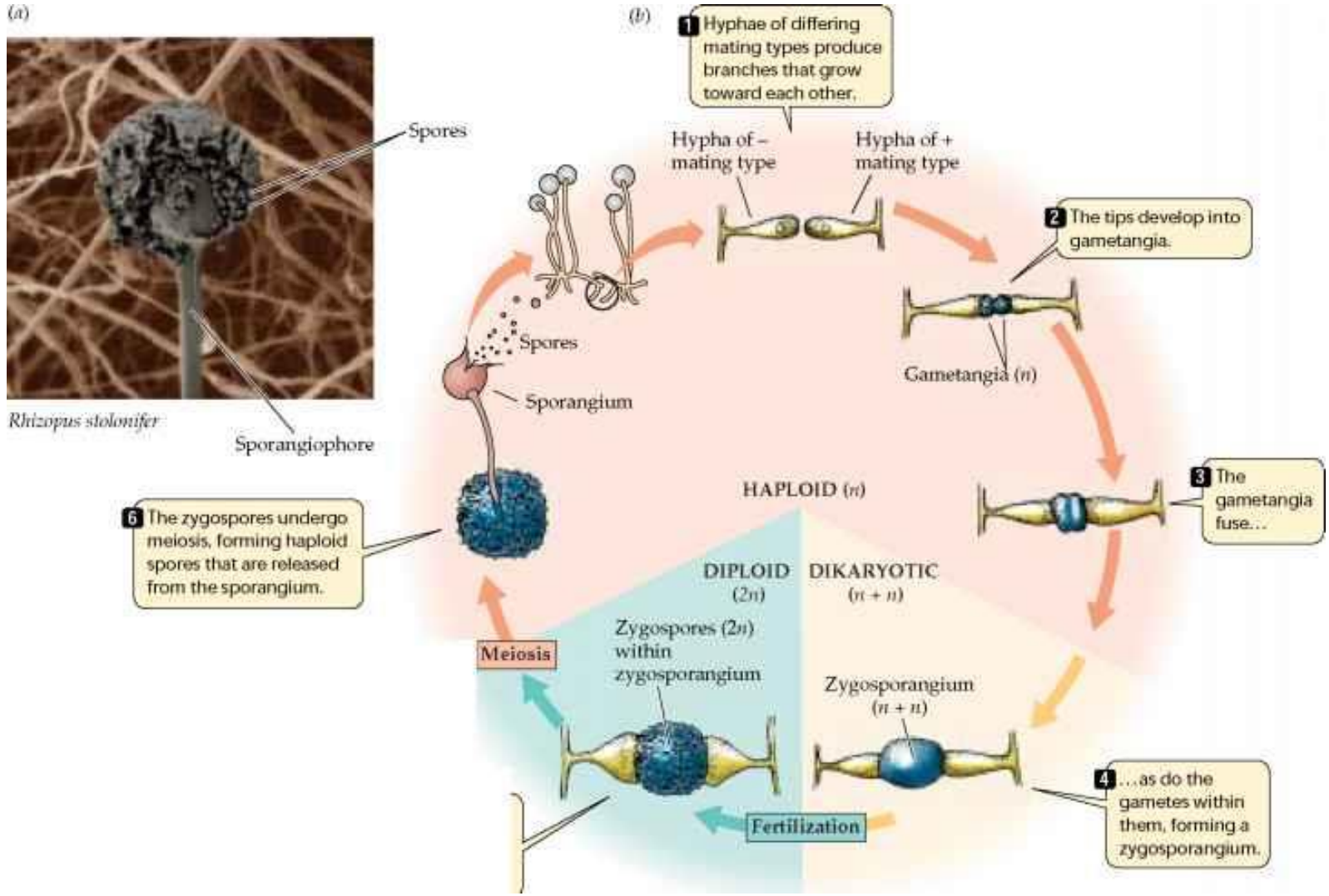
Blossom blight, scab, and brown rot management strategy



If resistance to FRAC 3's is suspected or verified, use Indar 2F at 12 floz (24C) or Tebucon 45DF at 8 oz OR use Tilt + low rates of Indar or Tebucon

Rhizopus stolonifer
of Peach

Rhizopus stolonifer Life Cycle



Disease Progression of a Normally Weak Pathogen

R. stolonifer colonizes all organic vegetation, including peach fruit on the ground, and produces thick-walled spores resilient to drought that linger on decaying organic material, on the ground, in crates and bins.

The fungus accumulates on the orchard floor from first to second to third pick due to increasing numbers of fruit on the ground.

Rhizopus Management Strategy

Preharvest

- *Rhizopus* spp. invades only ripe fruit that have been **injured** and the decay is a postharvest concern only. Where Rhizopus fruit rot is a problem, **treat 10 days to 1 day before harvest**. *University of California*

Postharvest

- After harvest, *Rhizopus* can be controlled by storing the crop at temperatures below 40°F.
- Sanitize bins and packinghouse
- Minimize fruit handling

PDMR – Plant Disease Management Reports

Is Rhizopus listed?

Was there sufficient disease pressure?

Treatment and product rate in 100 gal water/acre [y]	Field	5 dph	11 dph	Rhizopus/Gilbertella rot incidence (%) [z] 5 dph	11 dph
Non-treated check					28.9
Merivon 500SC 5.0 fl oz 1, 2 PH	3.3 b	15.6 b	56.6 ab	1.0	35.6
Merivon 500SC 6.5 fl oz 1, 2 PH	4.1 b	7.8 b	32.0 b	2.2	6.7
Pristine 38WG 12.0 oz 1, 2 PH	2.4 b	16.7 b	52.2 b	1.1	14.4
LUNA Sensation 500SC 4.0 fl oz 1, 2 PH	5.1 b	3.3 b	31.1 b	0.0	4.5
FLSD $\alpha = 0.05$	3.4	22.9	29.5	N.S.	N.S.

[y] Latron B-1956 at 7.68 fl oz/100 gal was tank-
treatments.

[z] Means within each column followed by the s

Are the treatments/rates suitable and were there differences between treatments?

Results of PDMR Meta-Analysis

	Efficacy
FRAC 7	
-Fontelis, Luna Privilege	43% (n=4)
FRAC 3	
-Tilt, Indar, Inspire Super	44.4 % (n=11)
FRAC 7/11	
-Pristine, Merivon, Luna Sensation	67% (n=17)
FRAC 12	
-Scholar	86% (n=1)

My Recommendations for You

- Maximize Sanitation Practices to reduce fungal inoculum and chances of outbreaks
- Apply a smart spray strategy to (i) spray ‘as needed’, (ii) achieve maximum disease control, and (iii) prevent selection for resistance
- Continue to educate yourselves and embrace new technology; some of it may actually help you make better decisions and perhaps save you time and money

Thank You!