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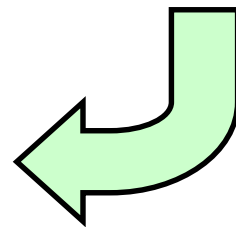
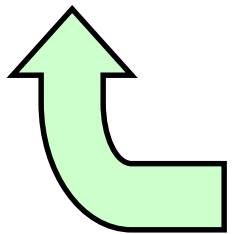
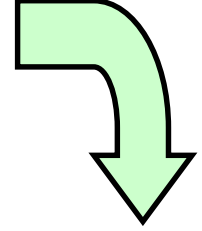
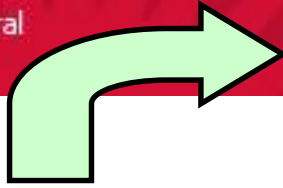
Contribution of Mid-Season Cover Sprays to Management of Peach Brown Rot at Harvest

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Peach Brown Rot



Peach Fungicide Efficacy Study

Brown Rot - Harvest Assessment

Treatment	Timing*	% Inf Fruit	% Control
Non-treated control	-----	51.8 a	-----
Vanguard Captan Elite / Pristine / Indar	P, B, PF SS, 1C-8C 18, 9, 1 dph	9.7 c	81.3
Vanguard Captan	P, B, PF SS, 1C-8C	20.8 b	59.8

* Harvest assessment performed 27 days after final cover spray at 8C

Peach Fungicide Efficacy Study

Brown Rot - Harvest Assessment			
Treatment	Timing*	% Inf Fruit	% Control
Non-treated control	-----	69.4 a	-----
Vanguard (2) / Rally Bravo Ultrex Captan Gem / Indar / Fontelis	P, B, PF SS 1C-7C 18, 9, 1 dph	2.9 c	95.8
Vanguard (2) / Rally Bravo Ultrex Captan Microthiol Disperss	P, B, PF SS 1C-3C 4C-7C	30.6 b	55.9

* Harvest assessment performed 23 days after final cover spray at 7C

Questions

1. Do summer cover sprays contribute to management of brown rot at harvest?
2. Do all cover spray fungicides, usually protectants, provide this control?
3. What is the mechanism of this control contribution?

Cover Spray Study



Cover Spray Study Treatments

Fungicide Treatment*	Label Rate(s)	Rate/A
Captan 80WDG	2.5 – 5.0 lb	3.75 lb
Microthiol Disperss 80DF	10 – 20 lb	12 lb
Ziram 76DF	4.5 – 8.0 lb	6.25 lb
Thiram Granuflo 75WDG	3.5 lb	3.5 lb

* All fungicides applied at SS, 1C, 2C, 3C, 4C, 5C, 6C

Cover Spray Study



**2012
Results**

Brown Rot – Harvest Assessment *

Fungicide Treatment	Timing	% Inf fruit	% Control
NTC	-----	55.3 ab	-----
Captan 80WDG Indar 2F (6 fl oz)	SS, 1C–6C 14, 5 dph	20.6 e	62.7
Captan 80WDG	SS, 1C–6C	24.7 de	55.3
Microthiol 80DF	SS, 1C–6C	60.4 a	0.0
Ziram 76DF	SS, 1C–6C	45.0 bc	18.6
Thiram 75WDG	SS, 1C–6C	38.1 cd	31.1

* Harvest assessment performed 25 days after final cover spray (6C)

Cover Spray Study



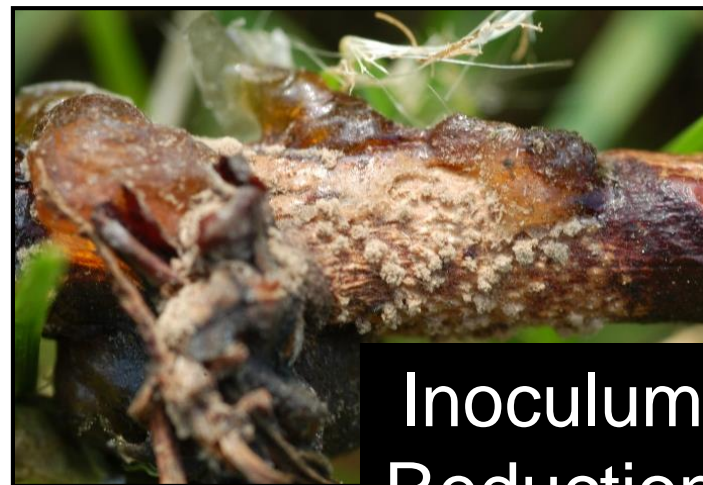
**Mechanism
of Control?**



Mechanism
of control?



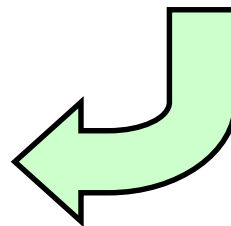
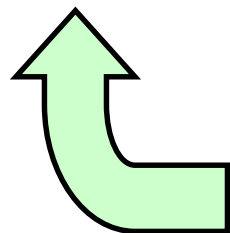
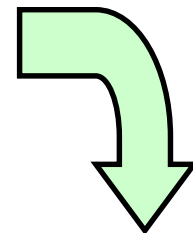
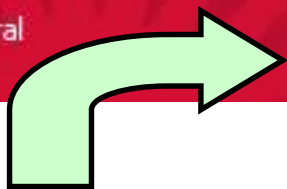
Peach Brown Rot



Inoculum
Reduction



Residual
Activity





Bioassay Technique

- ❖ Harvest fruit w. residue
- ❖ Install polyvinyl well
- ❖ Add Mf012ss inoculum
- ❖ Incubate 6 hours @ 25°C
- ❖ Assess spore germination

Cover Spray Study



2013 Results

- ❖ Mechanism for Control
 - Anti-Sporulant Effect?
 - Fungicide Residue?
- ❖ Brown Rot at Harvest

Anti-Sporulant Effect on Cankers?

Fungicide Treatment	% Sporulating Cankers*		
	23-Jul	30-Jul	6-Aug
Non-Treated Control	39.6 a	39.6 a	49.1 a
Captan 80WDG	0.0 b	16.3 a	44.8 a
Microthiol 80DF	12.5 ab	18.8 a	16.3 a
Ziram 76DF	4.2 b	40.6 a	61.2 a
Thiram 75WDG	15.0 ab	50.0 a	53.3 a

* Sporulation assessments @ at 8, 15, & 22-days after 6C

Fungicide Treatment	Bioassay (% germ)*			Brown Rot**
	22-Jul	29-Jul	5-Aug	(% Inf fruit)
Non-Treated Control	74.8 a	78.5 a	79.9 a	38.0 ab
Captan 80WDG Indar 2F (16 & 7 dph)	-----	-----	-----	9.3 d
Captan 80WDG	19.0 c	25.0 b	42.6 b	19.2 cd
Microthiol 80DF	33.1 bc	64.5 a	61.1 ab	54.5 a
Ziram 76DF	41.0 bc	60.8 a	51.4 ab	36.9 ab
Thiram 75WDG	55.1 ab	71.4 a	66.9 ab	33.0 bc

* Bioassay performed at 7, 14, & 21-days after final 6C spray

** Harvest assessment performed on 9-August

Cover Spray Study



2014 Results

- ❖ Mechanism for Control
 - Anti-Sporulant Effect?
 - Fungicide Residue?
- ❖ Brown Rot at Harvest

But

2014: Subzero temps, then Hail !!!



Cover Spray Study



2015 Results

- ❖ Mechanism for Control
 - Anti-Sporulant Effect?
 - Fungicide Residue?
- ❖ Brown Rot at Harvest

Anti-Sporulant Effect on Cankers?

Fungicide Treatment	% Sporulating Cankers*		
	24-Jul	31-Jul	7-Aug
Non-Treated Control	38.7 a	56.1 a	80.7 a
Captan 80WDG	41.2 a	51.8 a	84.5 a
Microthiol 80DF	40.6 a	50.4 a	77.2 a
Ziram 76DF	45.9 a	65.6 a	83.5 a
Thiram 75WDG	41.3 a	60.2 a	71.9 a

* Sporulation assessments @ at 8, 15, & 22-days after 6C

Fungicide Treatment	Bioassay (% germ)*			Brown Rot**
	23-Jul	30-Jul	6-Aug	(% Inf fruit)
Non-Treated Control	77.6 a	74.6 a	84.5 a	19.8 ab
Captan 80WDG Indar 2F (16 & 7 dph)	-----	-----	-----	0.9 d
Captan 80WDG	14.9 c	15.0 c	31.4 b	6.2 c
Microthiol 80DF	51.5 b	48.1 b	62.9 ab	30.2 a
Ziram 76DF	62.3 ab	41.2 b	31.6 b	12.2 bc
Thiram 75WDG	69.2 ab	52.7 b	70.8 ab	27.5 ab

* Bioassay performed at 7, 14, & 21-days after final 6C spray

** Harvest assessment performed on 8-August

Cover Spray Study



Results Summary

- ❖ 2010 – 2015 data
- ❖ Captan Treatment
- ❖ Brown Rot at Harvest
- ❖ Rainfall - Preharvest

Pre-harvest Efficacy of Captan Cover Sprays

Brown Rot - Harvest Assessment					
	6C to Harvest		Brown Rot - % Inf Fruit		
Year	Days	Rain (in)	NTC	Captan	% Control
2010	27	3.18	51.8	20.8*	60
2012	25	1.38	55.3	24.7*	55
2013	25	3.83	38.0	19.2*	50
2014	24	1.66	few fruit – cold / hail		
2015	23	0.75	19.8	6.2*	70

* Significantly lower fruit rot than non-treated control

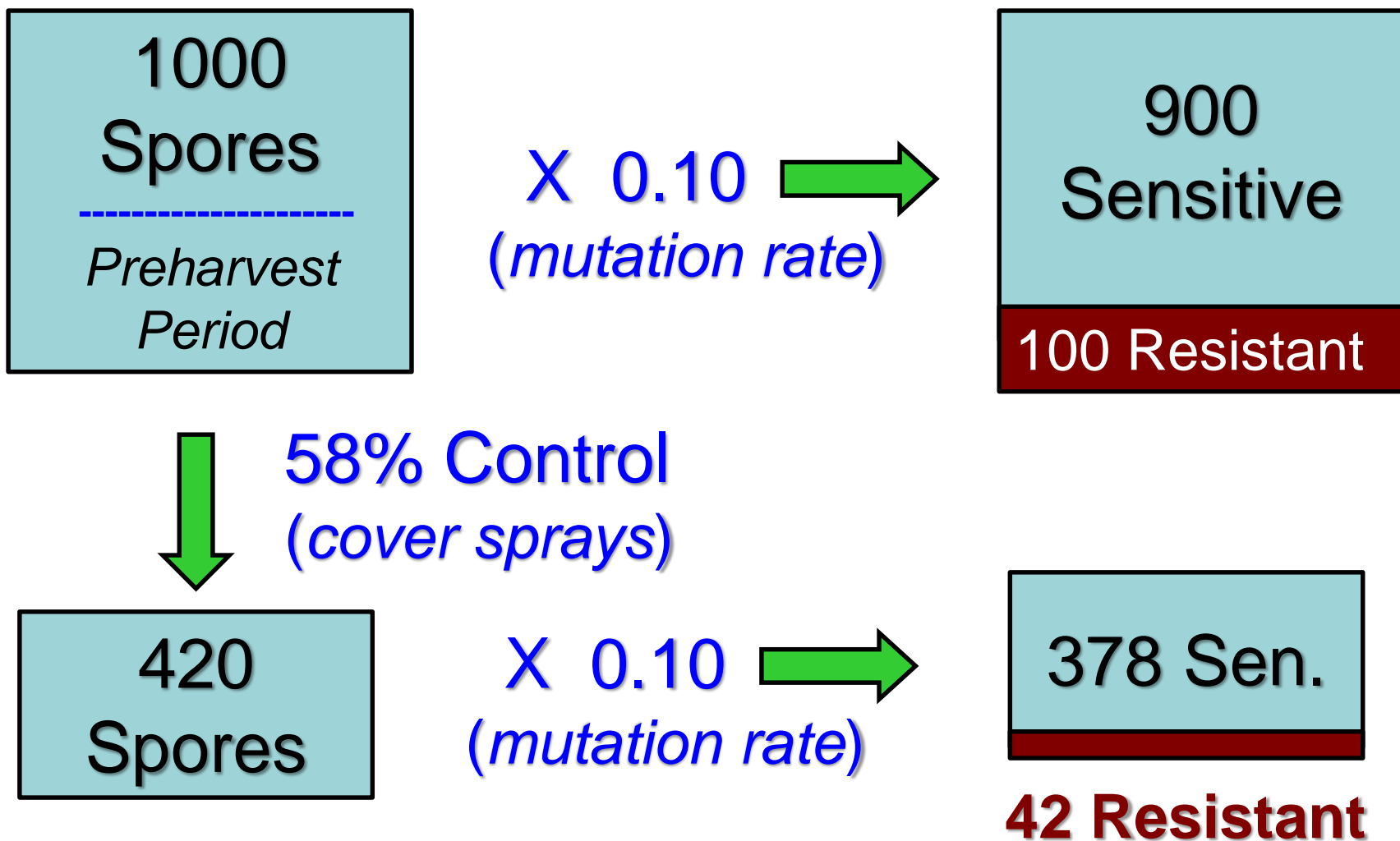
Summary / Conclusions

- ❖ Captan cover sprays significantly reduced brown rot at harvest over 4 years (average 58% control)
- ❖ Sulfur, ziram, and thiram failed to consistently reduce brown rot at harvest
- ❖ The mechanism for control was fungicide residue on fruit surface (bioassay), not anti-sporulant activity on blossom blight cankers

Importance

- ❖ Improve efficacy & dependability of preharvest prog.
- ❖ Reduce selection pressure against at-risk fungicides

Population Regulation Approach





**Peach
Scab**

**Peach
Scab**



	2012		2013	
Fungicide Treatment	% Inf Fruit	% Control	% Inf Fruit	% Control
Non-Treated Control	77.0 a	-----	35.0 a	-----
Captan 80WDG	14.0 c	82	5.0 b	86
Microthiol 80DF	10.0 c	87	4.2 b	88
Ziram 76DF	40.2 b	48	12.0 ab	66
Thiram 75WDG	44.3 b	42	33.7 a	4

Factors to Examine

- ❖ Influence of fungicide rate
 - Lower rates of captan ... as effective?
 - Will higher rates of sulfur or ziram be effective?
- ❖ Influence of cover spray timing
 - Early covers vs. mid covers vs. late covers
- ❖ Examine integrated cover spray programs
 - Early & mid-cover sulfur sprays followed by late-cover captan sprays
- ❖ Can pre-harvest fungicide usage be reduced?

Project Support



- ❖ **Pennsylvania
Peach & Nectarine
Research Program**
- ❖ **New Jersey
Agricultural
Experiment
Station**

Questions?

