

# Update: American Brown Rot and SI Fungicide Sensitivity Screening



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# American Brown Rot (ABR): *Monilinia fructicola*

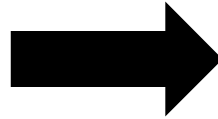


**Wetting event ~ 75°F is ideal for infection**

**Industry relies on sterol demethylation inhibitor fungicides (SI's) for control**

# What happened in 2011?

- **Observed heavy ABR infestations**
  - Caused by initial infections on green / immature fruit



- **Suspect cause of ABR infection on green fruit**
  - Initiation of Bacterial canker
  - Allowed early invasion of ABR through deteriorated tissue from canker infection

# Brown Rot Fungicide Efficacy

- **Indar (a.i. fenbuconazole) – has been, and continues to be the best fungicide for ABR management**
- **48 oz seasonal limit : (Section 24 (c) label rate)**
  - 12 oz. x 4 apps.
  - 8 oz. x 6 apps. etc....
- **Importance of “Indar math”**
  - Rate x application interval
- **ULTIMATE GOAL :**
  - Control brown rot fruit infection
  - With the least impact on potential development of fungicide resistance



# Brown Rot Fungicide Efficacy

- We don't have comparable alternatives to Indar

- But do have....

- Pristine

- Pyraclostrobin + boscalid

- New SDHI's

- Targets a different site of pathogen



- **GOAL:**

- Keep population size down

- Manage fungicide resistance

- Effectively use all the management tools we have to fulfill adequate control





**Disease will win.....**

**when environmental conditions are optimal or when some factor boosts it**

# What has been surveyed in Michigan?

- **79 Orchards assayed**
  - 2008-2011
  - Northwest, Fruit Ridge, Southwest MI
  - Cherry (tarts and sweets) and Peach
- **1,039 isolates**
- ***In vitro* fungicide analysis**



# Analysis of field isolates for SI sensitivity

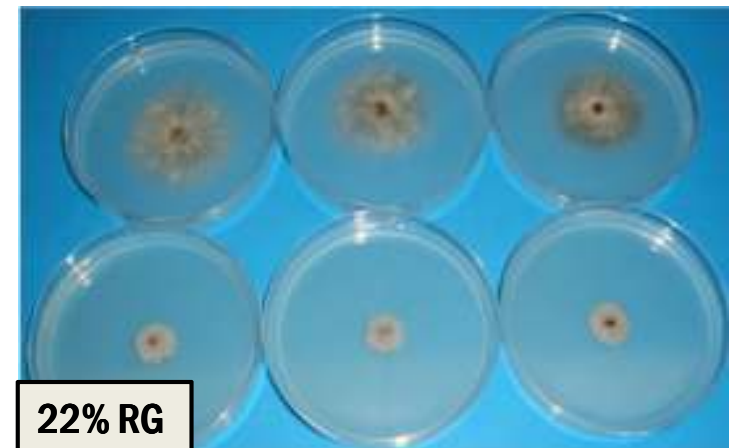
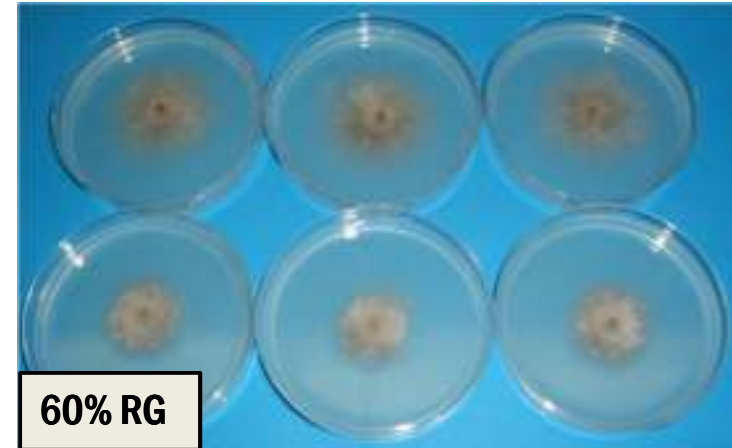
## Relative growth assay

- Comparison of growth on SI vs. control medium (%RG)
- Propiconazole (Orbit)

### Resistance category basis:

1. Isolate resistant =  $\geq 80\%$  RG
2. Orchard shifting = 50-66% RG
3. Orchard resistant =  $\geq 67\%$  RG

(Koller et al 1997)





# Overall ABR//SI survey results in Michigan

	Number of orchards	Number of isolates	Orchard average RG% of population	Range of individual isolate RG%	Region(s) within Michigan	Fruit crop
2008	30	565	9-42%	0-78%	Northwest	Cherry
2009	6	76	10-34%	0-87%	Northwest Southwest	Cherry Peach
2010	35	304	3-56%	0-76%	Northwest Southwest Fruit Ridge	Cherry Peach
2011	8	94	33-75%	19- 92%	Northwest	Cherry

1. Isolate resistant =  $\geq 80\%$  RG
2. Orchard shifting = 50-66% RG
3. Orchard resistant =  $\geq 67\%$  RG

# Northwest Michigan results

	Number of orchards	Number of isolates	Orchard average RG% of population	Range of individual isolate RG%	Region(s) within Michigan	Fruit crop
2008	30	565	9-42%	0-78%	Northwest	Cherry
2009	1	26	36%	7-68%	Northwest	Peach
2010	20	172	3-48%	0-65%	Northwest	Cherry
2011	8	94	33-75%	19-92%	Northwest	Cherry

1. Isolate resistant =  $\geq 80\%$  RG
2. Orchard shifting = 50-66% RG
3. Orchard resistant =  $\geq 67\%$  RG

# Big Picture in Michigan Orchards

- **2011 first time reduced SI sensitivity found in NW Michigan**
  - 3 resistant isolates
  - 1 shifted and 1 resistant orchard
- **SW Michigan:**
  - 1 resistant isolate (2009) and 2 orchards shifting in SI sensitivity (2010)
- **Overall, only:**
  - 4 of 1,039 isolates R      - 4 of 79 orchards shifting

**= ABR populations continue to be sensitive to SI's**

# Management recommendations in Michigan orchards

- Adequate coverage of SI applications
- SI's = Quantitative resistance
  - Higher rates and shorter intervals may provide control
  - Section 24(c) label – allows higher application rates
  - Not a long-term solution for management
- SDHI's are an option under low and moderate disease pressure
- Michigan isolates continue to be sensitive to SI's after 20 years of application

# Acknowledgements

**Nikki Rothwell**

**Erin Lizotte**

**Bill Shane**

**Phil Schwallier**

**Amy Irish-Brown**



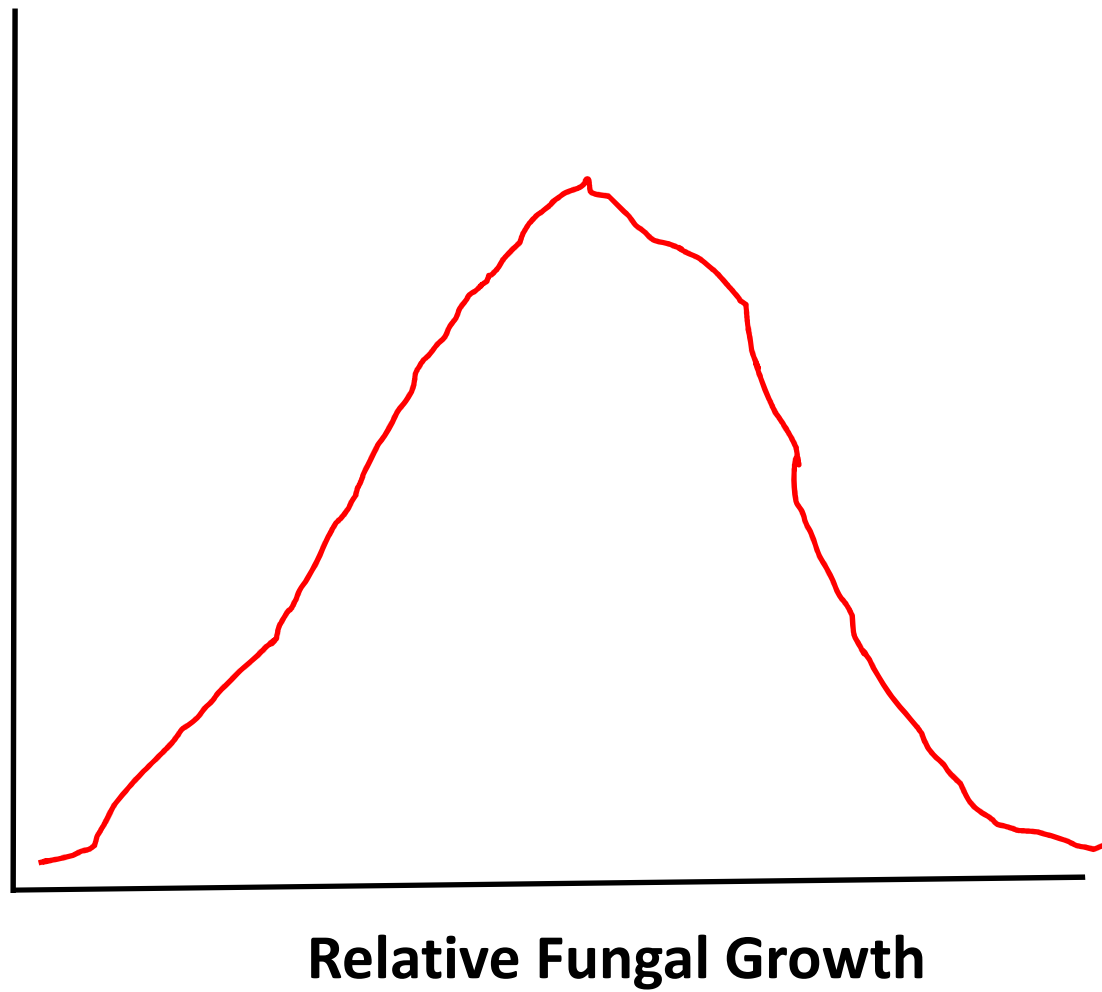
**Michigan Cherry Committee**

**MSU Project GREEN**

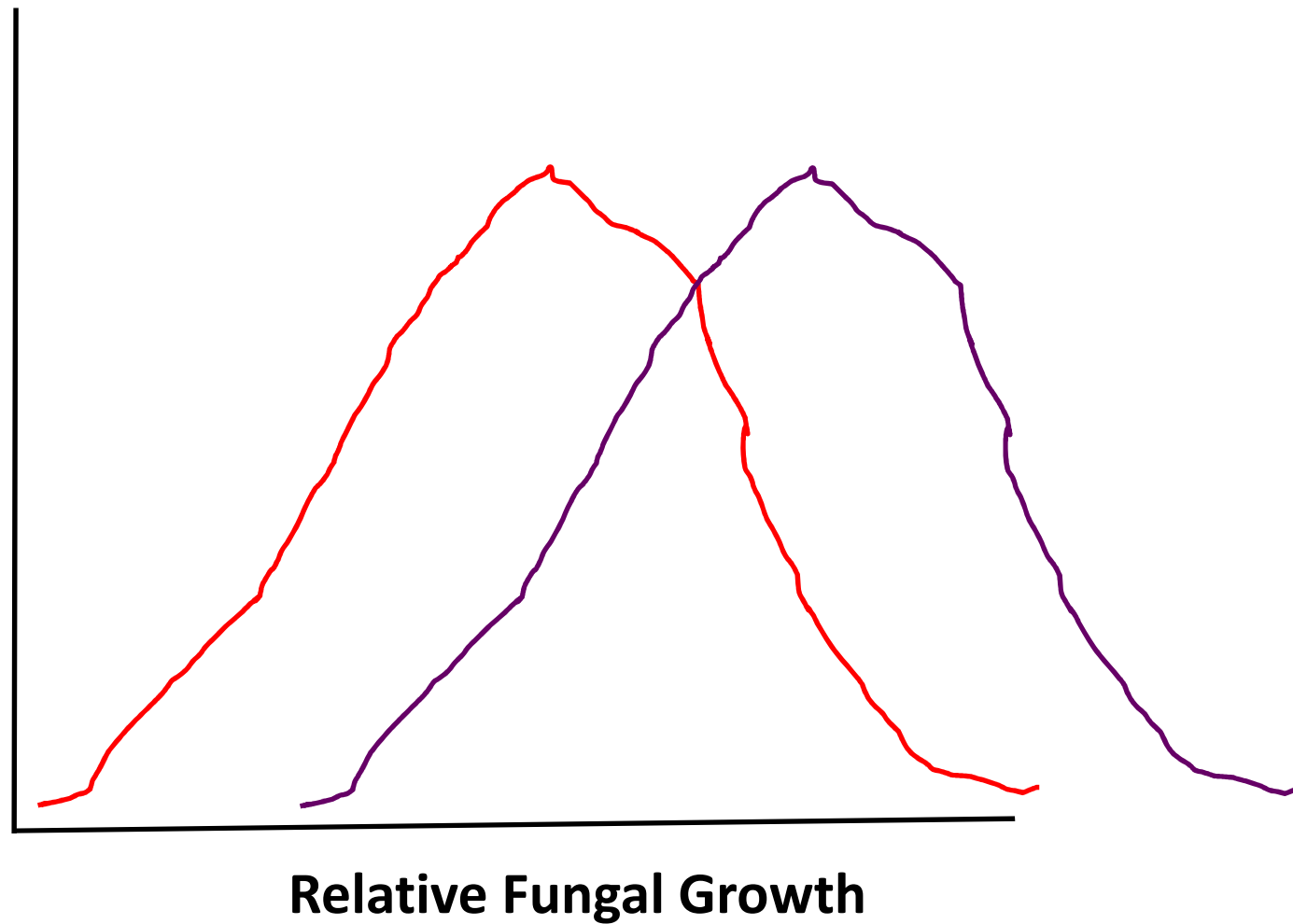




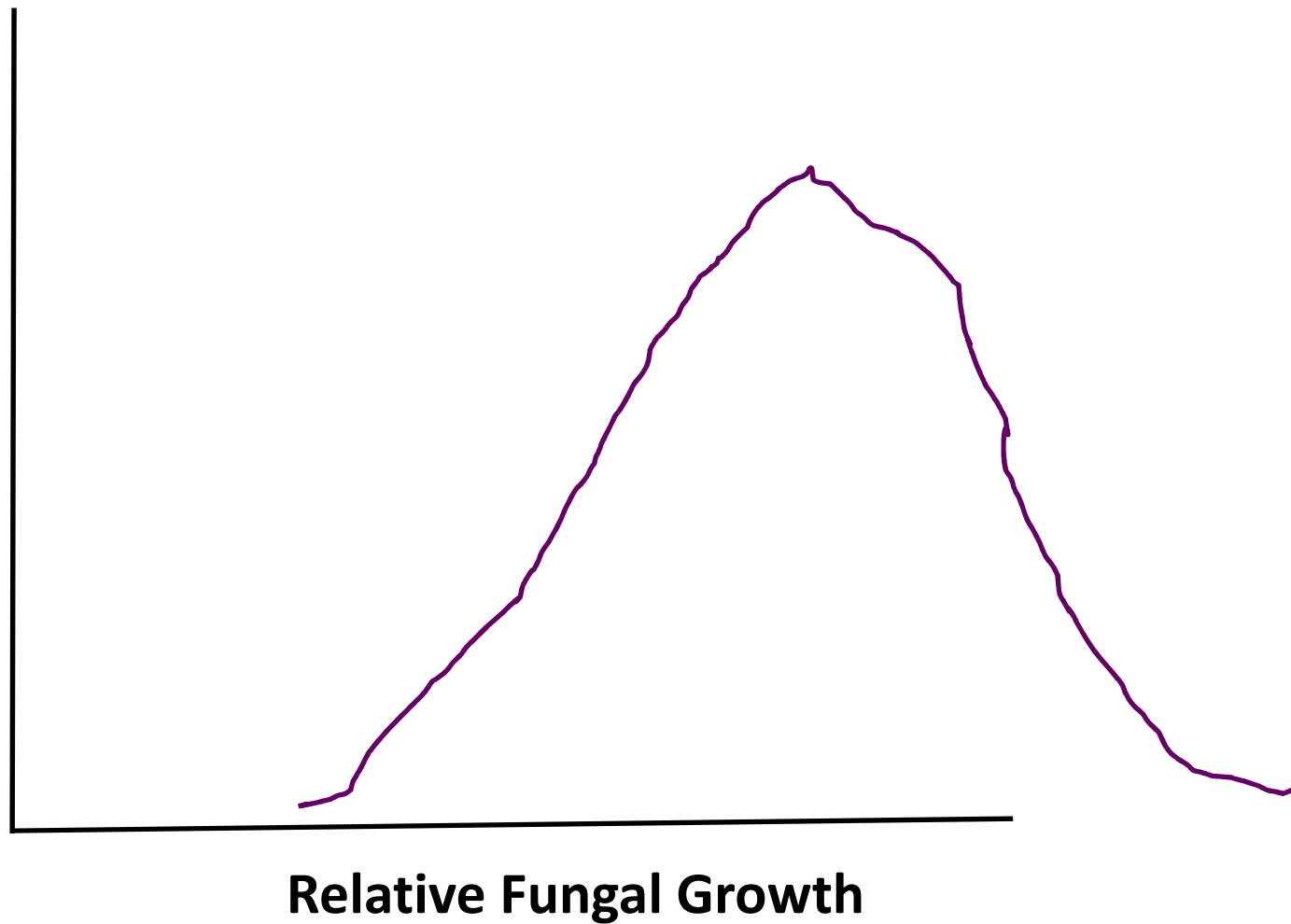
# SI's and Population Shifts



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# Brown Rot and SI's in Michigan, 2010

- Couple of things in our favor looking ahead:
- Section 24(c) label for Indar 2F for Michigan
- Use up to 12 fl oz/Acre
- 48 fl oz/Acre seasonal use rate





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