

## Cherry RAMP I & the "Had To's"

Mark Whalon



- Had to work as a team.
- Had to learn how Guthion worked.
- Had to learn PC biology and ecology.
- Had to learn how Guthion replacements worked.
- Had to "think out of the box" & attack PC with a "diversified" approach.
- Had to develop a PARTNERSHIP with the USEPA.

## Guthion (AZM) Used for 35+ Years!

- *It worked, that's all we needed to know...*
  - *Well, it's a different world today!*
  - *In the absence of AZM we will have to know much, much more to control PC...*
1. Biology, movement and reproductive ecology
  2. Tailor control strategy to PC's Biology in it's Environment at the time we spray/treat...
  3. Understand how our insecticide interacts with the environment, the targeted substrate and PC's life-stage biology and its location in the environment

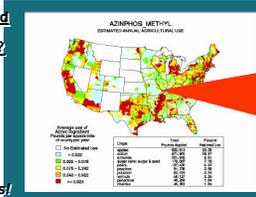
## Guthion Reregistration: the Final Decision Came from EPA on October 28<sup>th</sup>, 2006... USEPA: Has a specific and well oiled Re-registration Process

Technically Guthion (AZM)  
Has Lots of Very Significant Reregistration Problems.

Other Compound

Replacements?

- Synthetic Pyrethroids
- Carbamates
- Many other New compounds!



Key Considerations:

- Worker Protection
- Residues
- Eco- Impacts
- Cost vs Benefits
- Alternatives

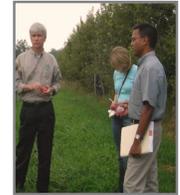
## Sweet and Tart Cherries

### AZM Rate Reduction Phase Out Plan

Season Max	2007-2009	2010-2012
	1.5 lbs ai/acre/year	.75 lbs ai/acre/year



- Aerial Applications Prohibited
- 60 ft Buffer Zone – Dwellings
- 60 ft Buffer – Water
- Pick Your Own – Prohibited



## Using Insecticides: 101

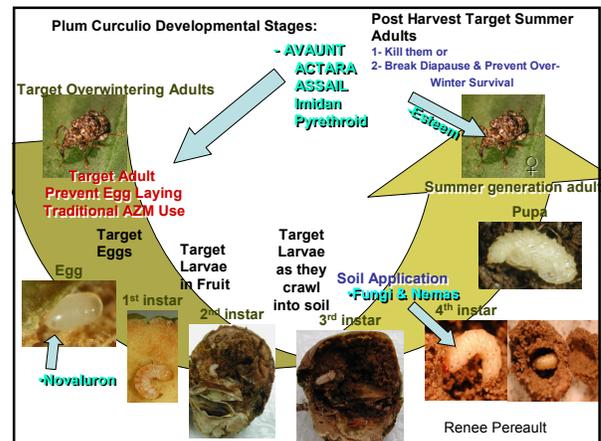
**Answers start with PG Insecticides**

**Key Question:**

- What's your target?
- Where is your target?
- Best way to "hit" the target?
- Characteristics of the delivered material & your target in its environment or setting?
- OR, How does the "material" you're delivering interact with the target in order to achieve a desired outcome?

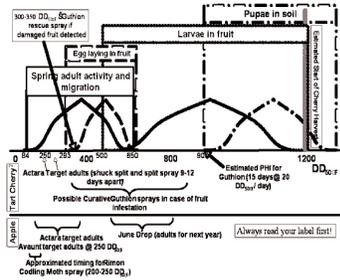
**10 WORMS In Fruit!**

- 1- Enviro. Conditions
- 2- Insecticide materials
- 3- Adjuvant(s)
- 4- pH of the carrier (H<sub>2</sub>O)
- 5- Other materials?
- 6- Target characteristics
- 7- Sprayer Characteristics
- 8- Dilution
- 9- Tree Row Volume
- 10- Etc.



## Timing Sprays: The PC Phenology Model

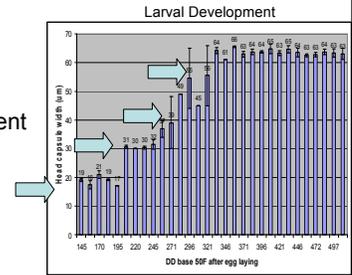
- Still Refining
- Much improved
- New Targets
  - Eggs
  - Larvae
  - Prepupa
  - Eclosed young adults
  - Summer Adults



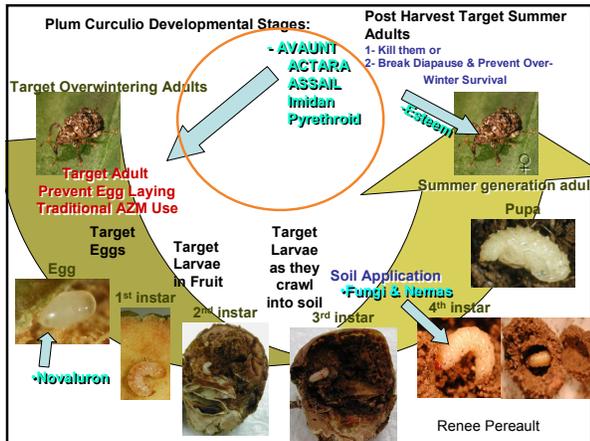
M. Whalon, R. Pereault & J. Laubach

## PC Phenology: Timing New Tools

- Spring Feeding
- Mating
- Egg Laying
- Larval Development
- Larvae Exit Fruit
- Pupation
- Summer Adult Emergence

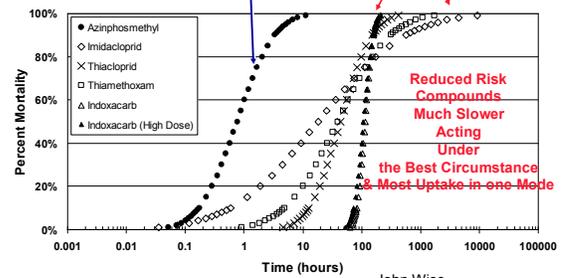


W. Bryane, R. Pereault, M. Whalon & P. Nelsen



Renee Pereault

## Lethal Time: AZM Vs. RR & OP Aits



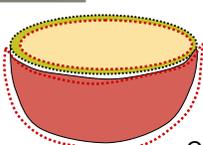
John Wise

## What AZM Does:



### TOXIC ACTION

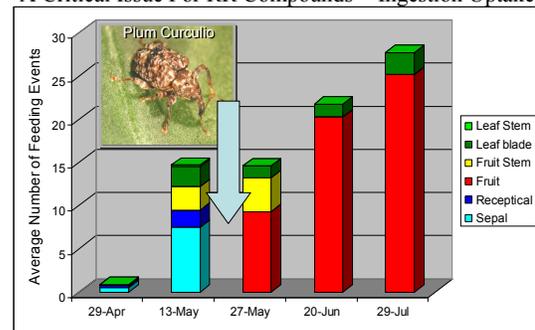
- Fumigant
- Contact Toxicant
- Ingested Toxin



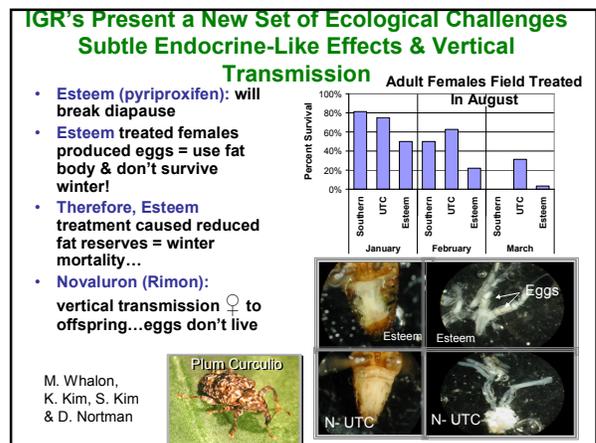
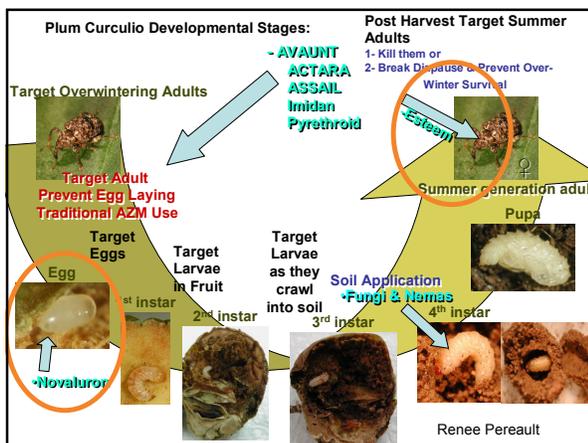
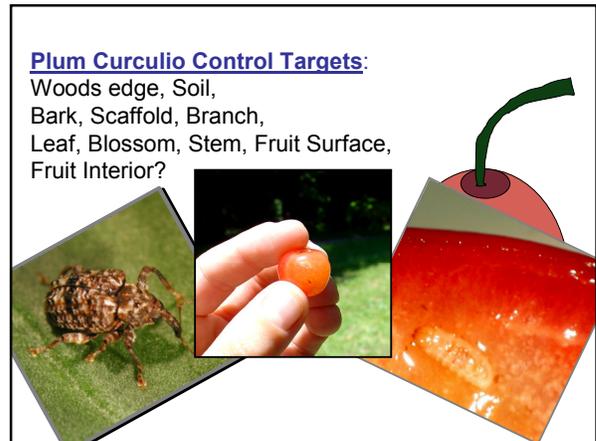
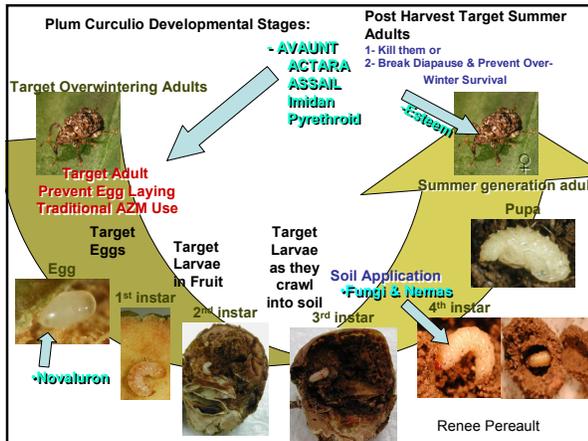
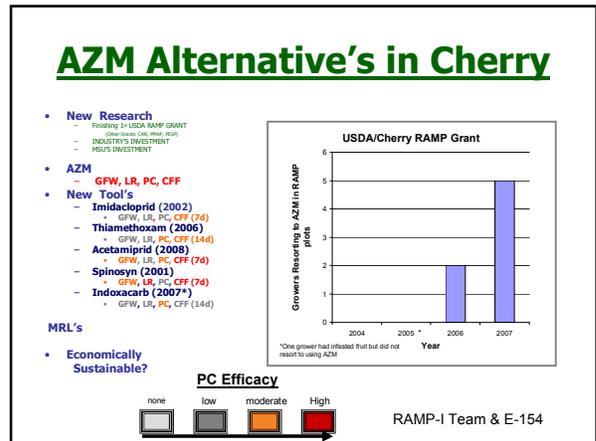
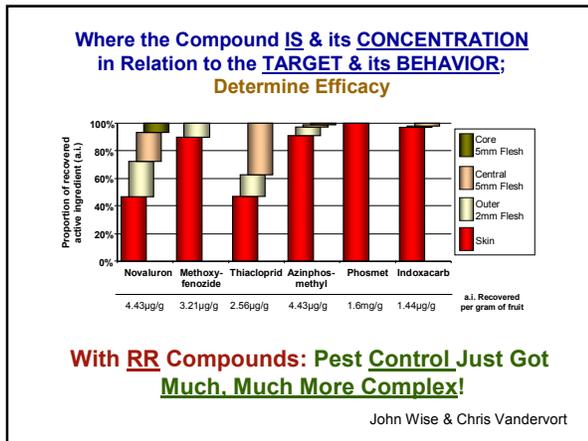
Kill larvae in fruit at 2ppm with no residue at harvest if timed well

- Covers the surface
- Penetrates the Fruit, Leaves Stems and Bark...

## Adult Feeding Patterns During Cherry Production Season A Critical Issue For RR Compounds = Ingestion Uptake



Eric Hofman



## USEPA & AZM Outcome? Better than Good! Considering the alternatives!



The Day that the USEPA Come to Town.  
Thanks to our cooperative efforts and to good relationships with people like Barb VanTil, USEPA Region 5 (9-10-07) (COP 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)

## FQPA Ushered Changes Yields New Insight!

Acute vs Chronic Effects of Various RR Insecticides

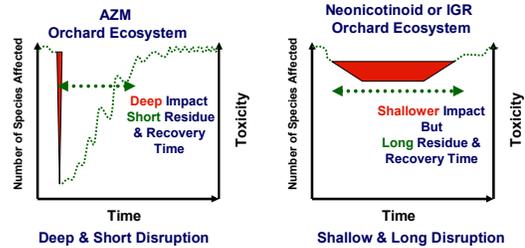


Figure 1. An illustration of the chronic ecological effects of different insecticides upon an orchard ecosystem.

## The Data That Kept AZM Alive

### Natural Enemy Sampling Summary for 2007

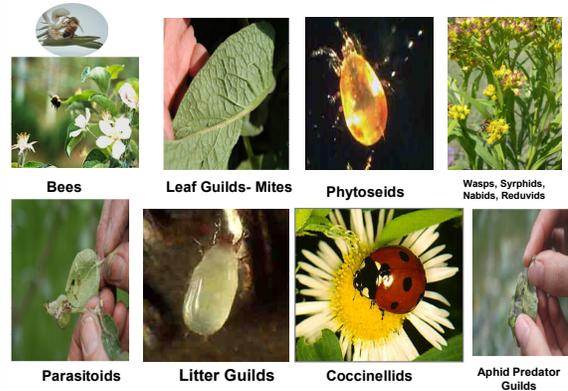
Shannon Diversity Index (H') measures diversity using species richness and evenness.

- H' = where p = (# of individuals in species *i*) / (total # of individuals)
- Richness (S) = Number of different species observed
- Evenness (E) = H' / H<sub>max</sub>; H<sub>max</sub> = ln(S)

2007 RAMP			
Grower	H'	Richness	Evenness
4	1.39	4	1.00
9	1.39	5	0.86
3	1.33	4	0.96
5	1.10	3	1.00
2	0.95	3	0.87
1	0.69	2	1.00
8	0.64	2	0.92
6	0.00	1	0.01
7	0.00	1	0.01

2007 COMP			
Grower	H'	Richness	Evenness
3	1.64	6	0.92
7	1.64	6	0.92
8	1.52	5	0.95
4	1.31	4	0.943
5	1.08	4	0.78
2	1.04	3	0.95
6	0.90	3	0.82
1	0.59	2	0.85
9	0.00	1	0.01

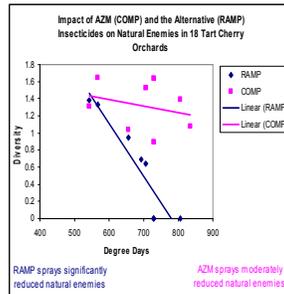
## Natural Enemy Biodiversity Indicators



## OP Alternatives More Damaging to the Environment than AZM?

### EPA Must Consider

- Worker Protection
- Residues
- Hormonal Effects
- Environmental Impact
- Ecological Impact



## Data that kept AZM Alive: Natural Enemy Indexes

### Cherry RAMP vs. COMP Blocks

Table 3: Average Shannon Indexes (H') by grower for the Yellow Sticky Method across 3 sample periods (pre- & post bloom & pre-harvest) during the season. The grower codes are ranked from greatest to least average H'.

Average RAMP Block		Average COMP Block		Total Average	
Grower	H'	Grower	H'	Grower	Total AVE H'
9-F	1.70	5-L	2.53	5-L	1.99
6-B	1.51	6-B	2.40	6-B	1.96
5-L	1.45	9-F	1.66	9-F	1.68
8-G	1.41	3-V	1.56	3-V	1.42
3-V	1.27	7-C	1.45	8-G	1.28
4-S	1.00	4-S	1.25	4-S	1.13
1-W	0.99	8-G	1.16	7-C	1.06
7-C	0.67	2-M	0.79	1-W	0.81
2-M	0.53	1-W	0.64	2-M	0.66
<b>S Ave</b>	<b>10.53</b>		<b>13.44*</b> (P= 0.05)		

(Diversity = Number of Good Guys : Bad Guys) AZM Blocks Rated Better Than Reduced Risk Blocks

**Bottom Line: RAMP DATA had a very Significant Impact**

1. **AZM or Guthion has many problems**
  - **FQPA:** Residues- Infants, Children, Preg. Mothers
  - **Worker Protection**
  - **Pesticide Drift**
  - **Water Issues**
  - **Ecological Impacts & History of "incidents"**
2. **Exceedingly unlikely that Cherry industry will get another reprieve!**
3. **Therefore, we must forge ahead into the Reduced Risk Pesticide world!**

**RAMP-II Management Team Meeting Tomorrow 9-12**

**"2008 & Beyond:"**

1. **Successful competed for and won a new 3-year (2008-2010) Cherry RAMP-II Grant**
2. **Will require an unprecedented push from the cherry industry...to adopt new chemistries and practices**
3. **Cherry Industry will require new registrations & MRLs from USEPA**
4. **Growing Cherries will cost more \$**



**Cherry RAMP-II Management Team Meeting**  
**Interested growers are invited to attend...**  
**9-12 Friday 1/18/08 NWHREC**