



# RAMP II

2008

## Michigan Tart Cherries

*Dr. Mark Whalon*  
Department of Entomology  
Michigan State University



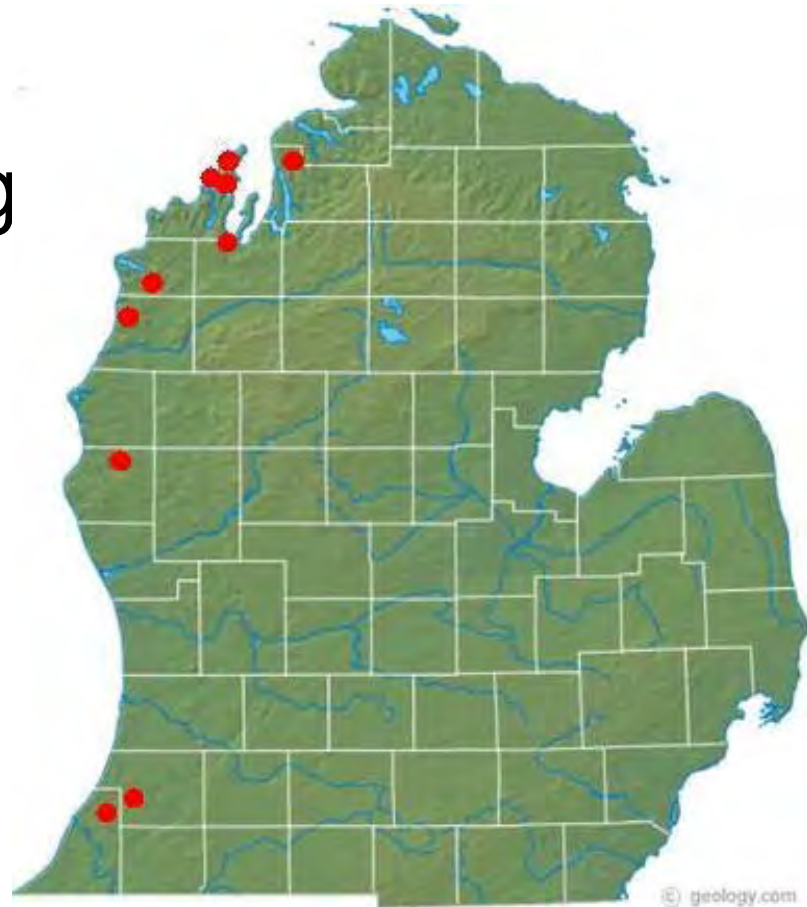
# Goals

- **RR, OP-alternatives:**
  - Develop, implement, and evaluate alternative pest management systems
- **Tart Cherry Industry:**
  - Enhance productivity, profitability, and competitiveness
- **Minimize risk:**
  - to workers, consumers, and environment

# Location

## 8 MI Cherry Growing Counties

Antrim, Benzie, Berrien,  
Grand Traverse, Manistee  
Leelanau, Oceana,  
Van Buren





# Experimental Design

- 10 Growers
- 2 Orchards each: Each Orchard ~10A
  - RAMP
    - AZM Alternatives
    - Reduced Risk Compounds
    - Organophosphate Alternatives
  - COMP
    - Conventional chemistries
    - No AZM (ideally)

# Treatment Regimes

## COMP

Combination of:

- Guthion<sup>®</sup> (azinphos-methyl)
  - Rate: 1.5 lbs./acre
- Imidan<sup>®</sup><sub>70-W</sub> (phosmet)
  - Rate: 2.5 lbs./acre
- Lorsban<sup>®</sup><sub>50-W</sub> (chlorpyrifos)
  - Rate: 3 lbs./acre
- Perm-UP<sup>®</sup>, Pounce<sup>®</sup> (permethrin)
  - Rate: 6.4-12.8 oz./acre

Tart cherry end use  
September 30, 2012

We avoided the use of  
AZM throughout this  
study...even for rescue  
sprays...

# Treatment Regimes

RAMP = 3 Alternatives

1. Assail/Delegate/Avaunt
2. Actara/Delegate
3. Avaunt/Provado

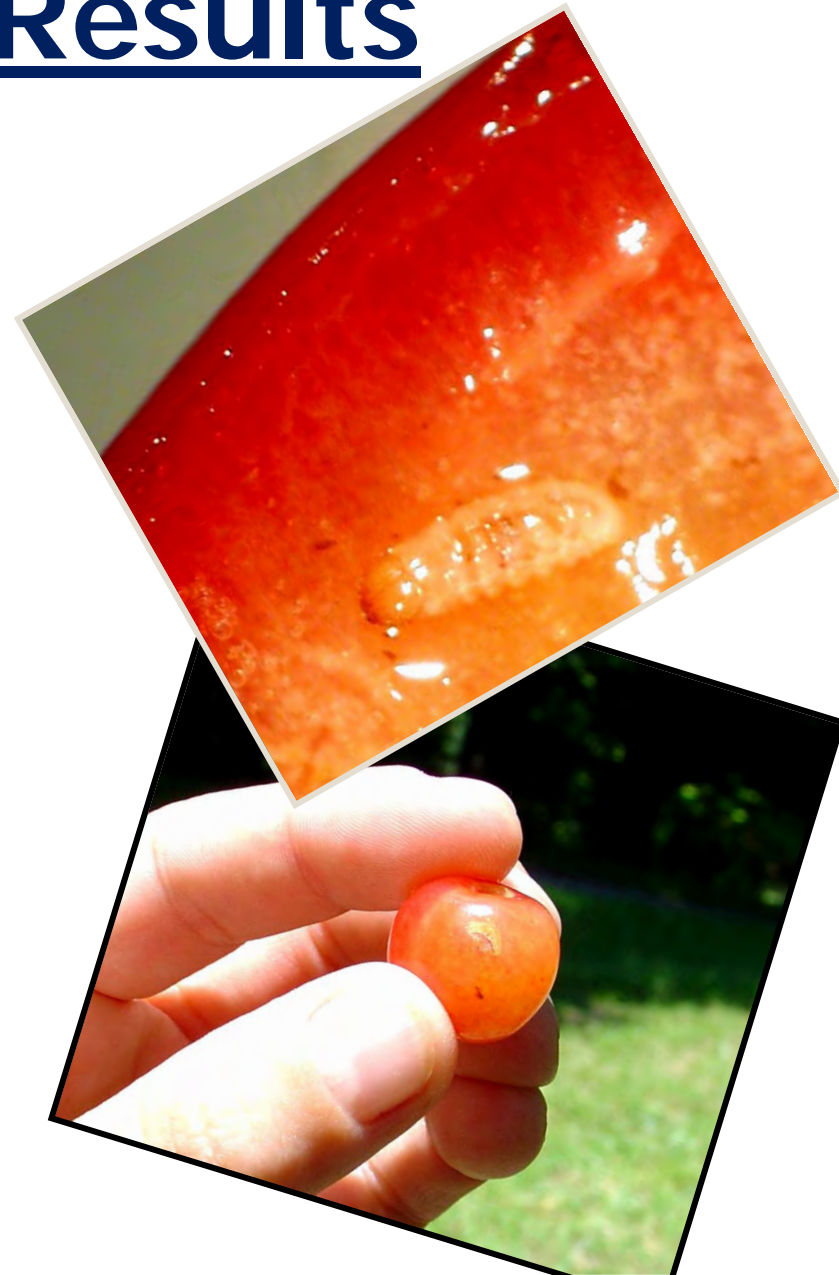
Actara<sup>®</sup> (thiamethoxam), Assail<sup>®</sup> (acetamiprid)

Avaunt<sup>®</sup> (indoxacarb), Delegate<sup>®</sup> (spinetoram)

Provado<sup>®</sup> (imidacloprid)

# 2008 Field Results

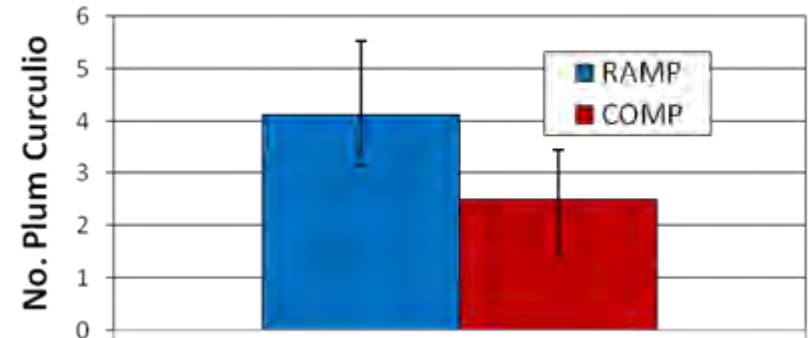
- One farm with Cherry Fruit Fly infested cherries at harvest
- Two farms with frost damage
- Three farms with additional treatments to control Plum Curculio



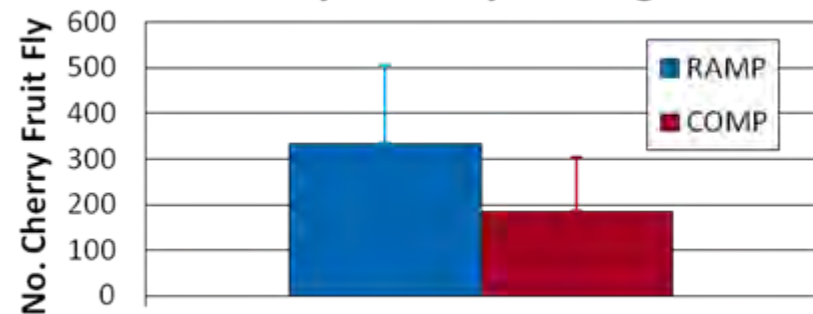
# Results

- Average Plum Curculio and Cherry Fruit Fly Counts

Plum Curculio Average



Cherry Fruit Fly Average

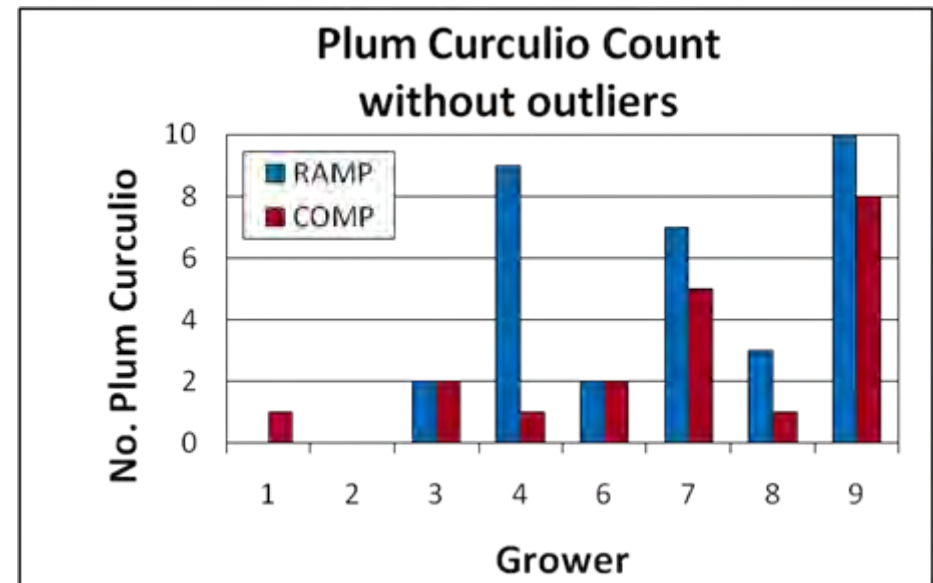
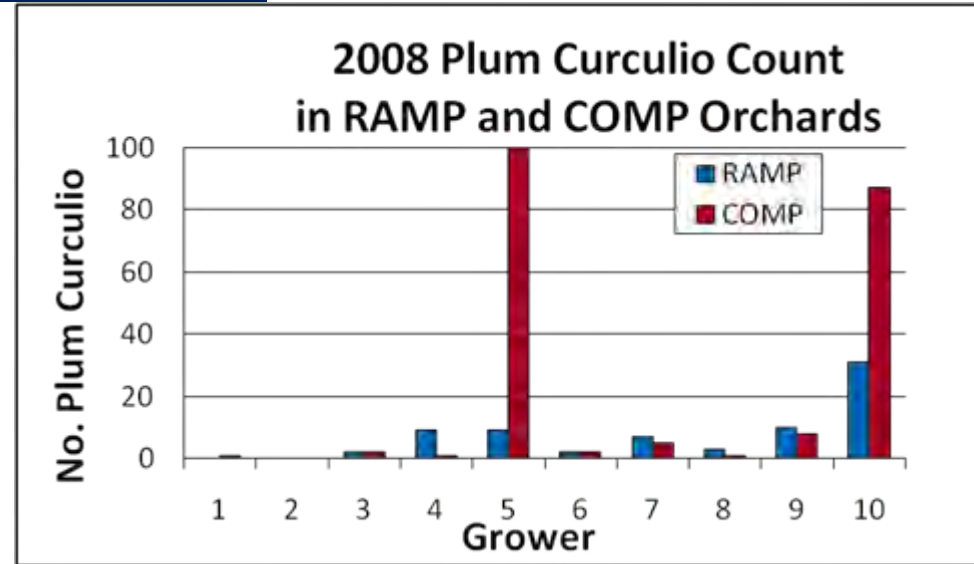


(PC average –outliers)

# Results

## Plum Curculio

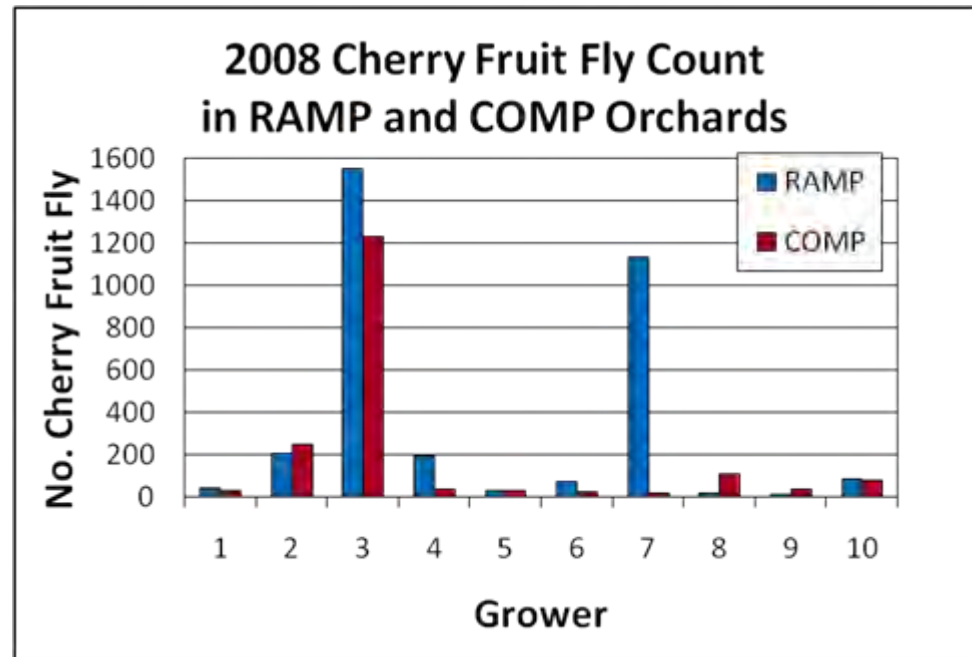
- Grower 5 had loss from frost damage
- Grower 10 is a first-time participant in the Risk Avoidance program
- RAMP Blocks exceeded COMP blocks in PC numbers trapped



# Results

## Cherry Fruit Fly

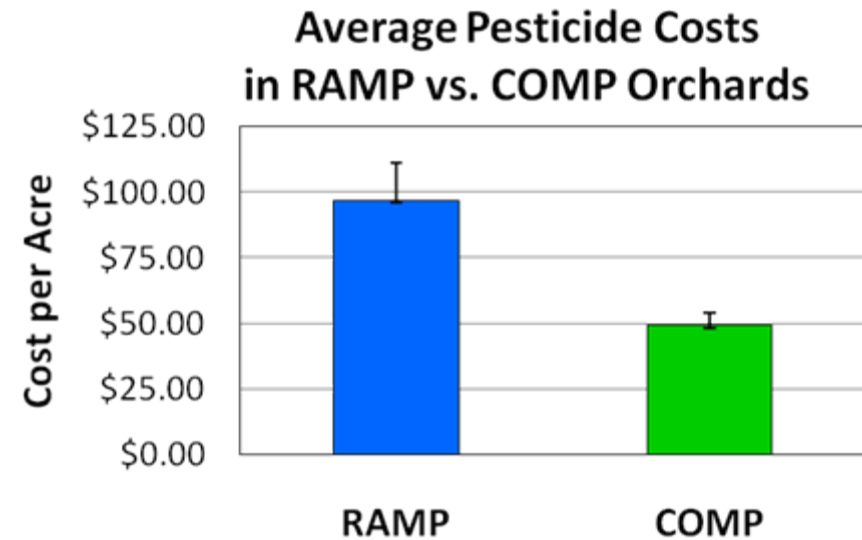
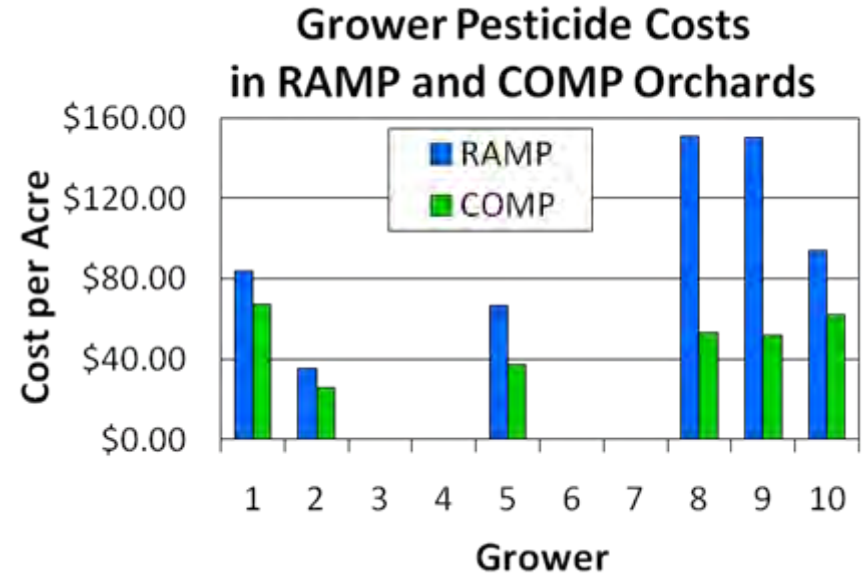
- There was 1 grower with infested fruit at harvest
- RAMP blocks exceeded COMP blocks in CFF trapped...



# Results

- Cost per Acre was higher in RAMP orchards for all growers\*
- Average\* cost was >40% higher per acre in RAMP

\*data includes 6 of 10 growers



# Results

## Measuring Ecosystem Services: Ecological impact of RAMP vs. COMP

- Shannon Diversity Index ( $H'$ )
- Richness ( $S$ )
- Evenness ( $E$ )

$$H' = -\sum p_i \ln(p_i)$$

$$p_i = \frac{\text{\# individuals in species } i}{\text{total number individuals}}$$

$$S = \text{\# different species observed}$$

$$E = \frac{H'}{H_{\max}}; \quad H_{\max} = \ln(S)$$

# Results

## Measuring Ecosystem Services

- Natural Enemy diversity was highest outside the orchards
- COMP diversity > RAMP in general
- COMP yielded 18% higher Ecosystem Services on average as measured in \$

