A Look at Imidan in Tart Cherry

"Phosmet"

MICHIGAN STATE UNIVERSITY

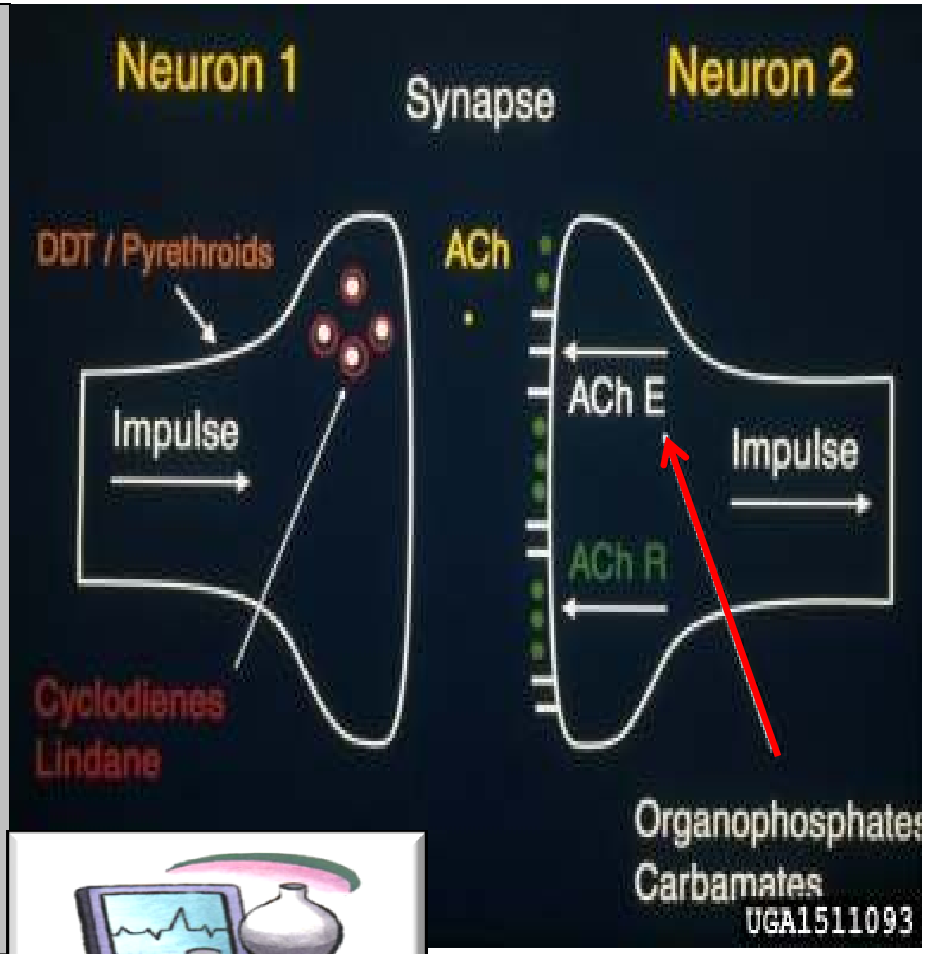
Mark Whalon With Help From- Phil Korson, John Wise, Larry Gut, Nikki Rothwell, luis Teixeira, Industry- Rick Cater, Cindy Baker, Consultants: Jim Laubach, Romain Lalone, Mike Hass, & Francis Otto, Grower Cooperators: Bardenhagen, Evans, Friske, Garthe, Gregory, Meachum, Smeltzer, Winkle, & VanAgtmael,

Imidan & Tart Cherries

- **OPs Under Attack:**
- **What we have learned:**
  FQPA: RAMP Summary
- **Pre-Harvest Strategies**
- **Post-Harvest Strategies**
- **MRL's & MOE's**

How AZM, Imidan, Lorsban, etc. / OP's Work

- Act @ Nerve Junction
- Interrupt Nerve Signals
- Bind Ach-Esterase
- Affect:
  - Respiration, Vision, ...
  - Muscle contraction
  - Rapid Onset, Spasm



Global Green Movement End OP's?

- Linked to the Consumer Movement
- Global in scope: extending even into 2/3's world
- Transects demographics of society
- Projected to expand well into the 21st Century
- **Strongly affects regulatory policy**

How does Society benefit When farms fail?

What happens when Farms Fail?

Greater Pollution
Greater Sprawl
More Pavement
Less Diversity
Less Ecosystem function
More Water Diversion
Less Carbon Sequestration

US Pesticide Policy History at a Glance

1900

1906 FFDCA enacted

1910

1920

1938 Miller Amendment to FFDCA

1947 FIFRA Enacted

1930

1940

1958 Food Additives Amendment to FFDCA
1959 FIFRA Amended

1964 FIFRA Amended

1950

1970 EPA formed

1960

1972 FEPCA Amendment to FIFRA
1973 Endangered Species Act
1974 Transportation Safety Act

1970

1980

1986 Right-To-Know Act
1986 OSHA's Hazard Communication Standard
1988 FIFRA Amended

1990

1990 Clean Air Act
1992 Montreal Protocol
1996 FQPA amendment to FFDCA and FIFRA

2000

2003 Pesticide Registration Improvement Act
2007 PRIA 2
2008 Farm Bill (significant research provisions for "specialty" crops = food in the diets of 'at risk' populations)

2010

2009 6th Circuit Court ruling on pesticides near water NPEDES

Accelerating Add'n of New Legislation

- OP's Highest Death Rate Insecticides…
- FQPA = Limit Exposure of At Risk People
- Outcome measures: Regulate…
  Food Residues, Workers & Environment

What FQPA Brought the Cherry Industry

Pre-FQPA		Post FQPA
- Refined IPM System	Vs.	Chaos in Spray Programs
- Simple OP- Pest Mngt.	Vs.	>> Complexity
- Solid Efficacy = low risk	Vs.	>> Risk of Crop Failure
- > 5 Stable Ecosystems	Vs.	High Ecosystem Impacts
- Known Enviro Impacts	Vs.	Unknown Enviro Impacts
- OK Economics	Vs.	Economic Uncertainty

Today, with the GREEN PAC's & Enviro-Group efforts in DC, US growers are more like the "hunted" than the "green" good guys Despite their record of rapid change!

Most DC Pesticide mandates are imposed ONE SIZE FITS ALL with no remuneration!

Honestly GREEN often depends on

Who's Eating Your Cherries?

Primary Insects

Plum Curculio

Cherry Fruit fly

Leafrollers

Green Fruitworms

Borers

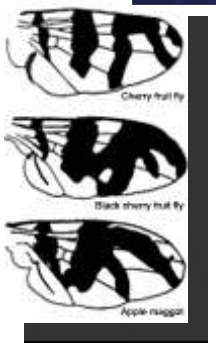
Secondary

Mites

Aphids

Scale

X-Disease Vectors



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Tart Cherry Ramp Report to EPA '09

- **Research & Adoption Investments**
  - USDA RAMP GRANT
  - INDUSTRY'S Investment
  - Individual Grower's = labor, risk, yield loss
  - MSU'S INVESTMENT
  - **Total Investment ~ $3M to date…**
- **AZM Terminates 2012**
  - **GFW, LR, PC, CFF**
- **Imidan: OP with MOE, MRL Issues**
- **New Tool's**
  - **Imidacloprid (2004)**
    - **GFW, LR, PC, CFF (7d)**
  - **Thiamethoxam (2006)**
    - **GFW, LR, PC, CFF (14d)**
  - **Acetamiprid (2008)**
    - **GFW, LR, PC, CFF (7d)**
  - **Spinosyn**
    - **GFW, LR, PC, CFF (7d)**
  - **Indoxacarb (2007*)**
    - **GFW, LR, PC, CFF (14d)**
  - **Spinetoram (2008)**
    - **OBLR, CFF? (7d)**
- **MRL's – Codex Issues with new insecticides & Imidan?**
- **Ecological Impacts of the Alternatives?**
- **Economically Sustainable Production: increasing 25 to 50% Pesticides?**

Control: AZM NO failures in 6 years = 0/40

RAMP: Failure History = 13/40

Year	Total	PC	CFF	Other
2004	1		1	
2005	1	1		
2006	3	2	1	
2007	5	3	1	1
2008	3	2	1	
5 yrs	13	8	4	Jap Beetle

1- Growing plum curculio and CFF populations in and around orchards

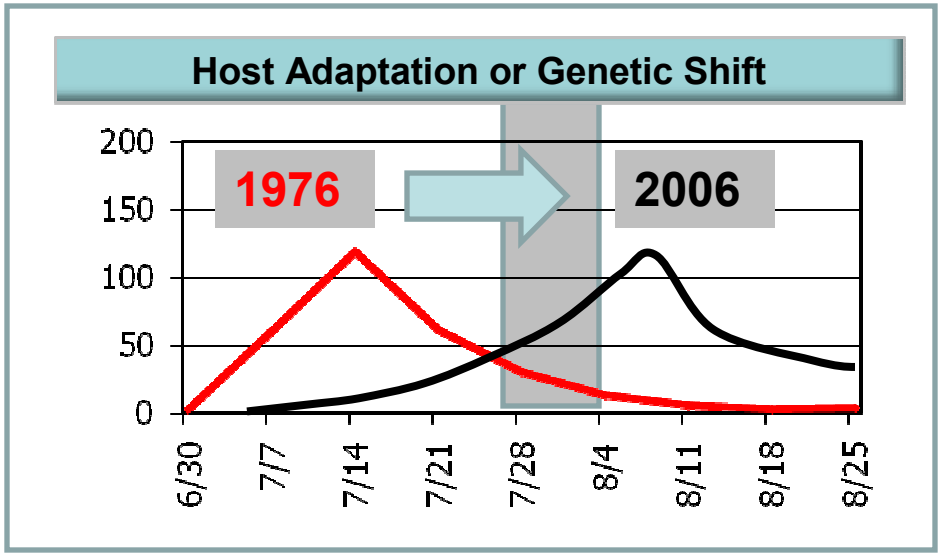
2- Much, much greater complexity and cost to control pests

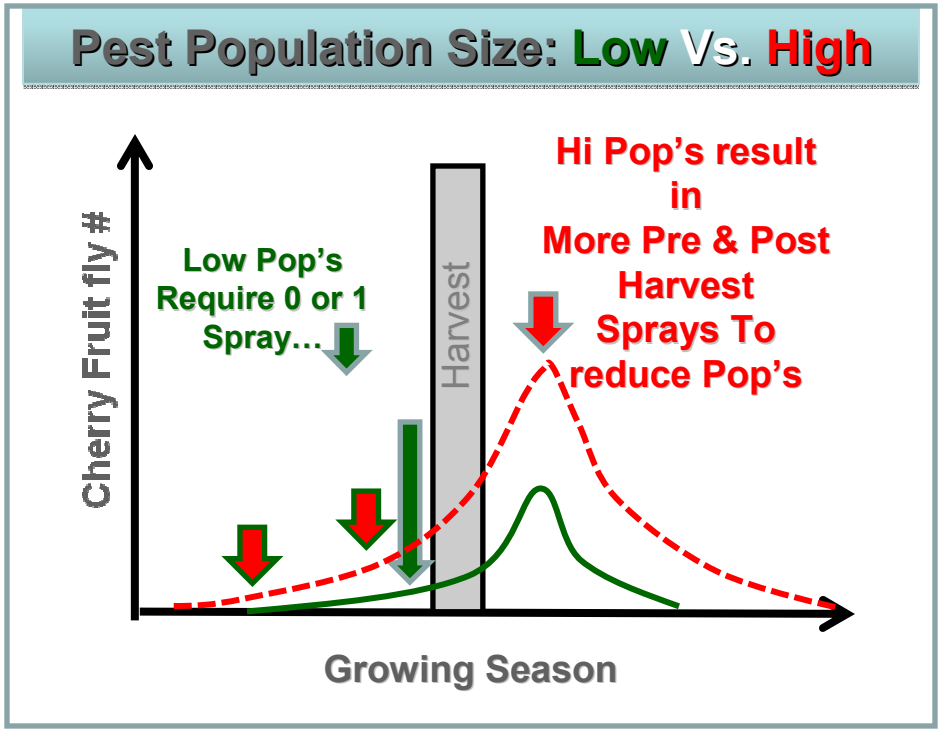
3- Much greater risks on the part of growers = bankruptcies

4- Jeopardize markets Internationally and Nationally… MRL's, Crop Fluctuations

Cherry Fruit Fly

- Higher Populations
- More Sprays in Season?
- Post-Harvest Spray to Reduce Populations the Next Year?
- Genetic Change





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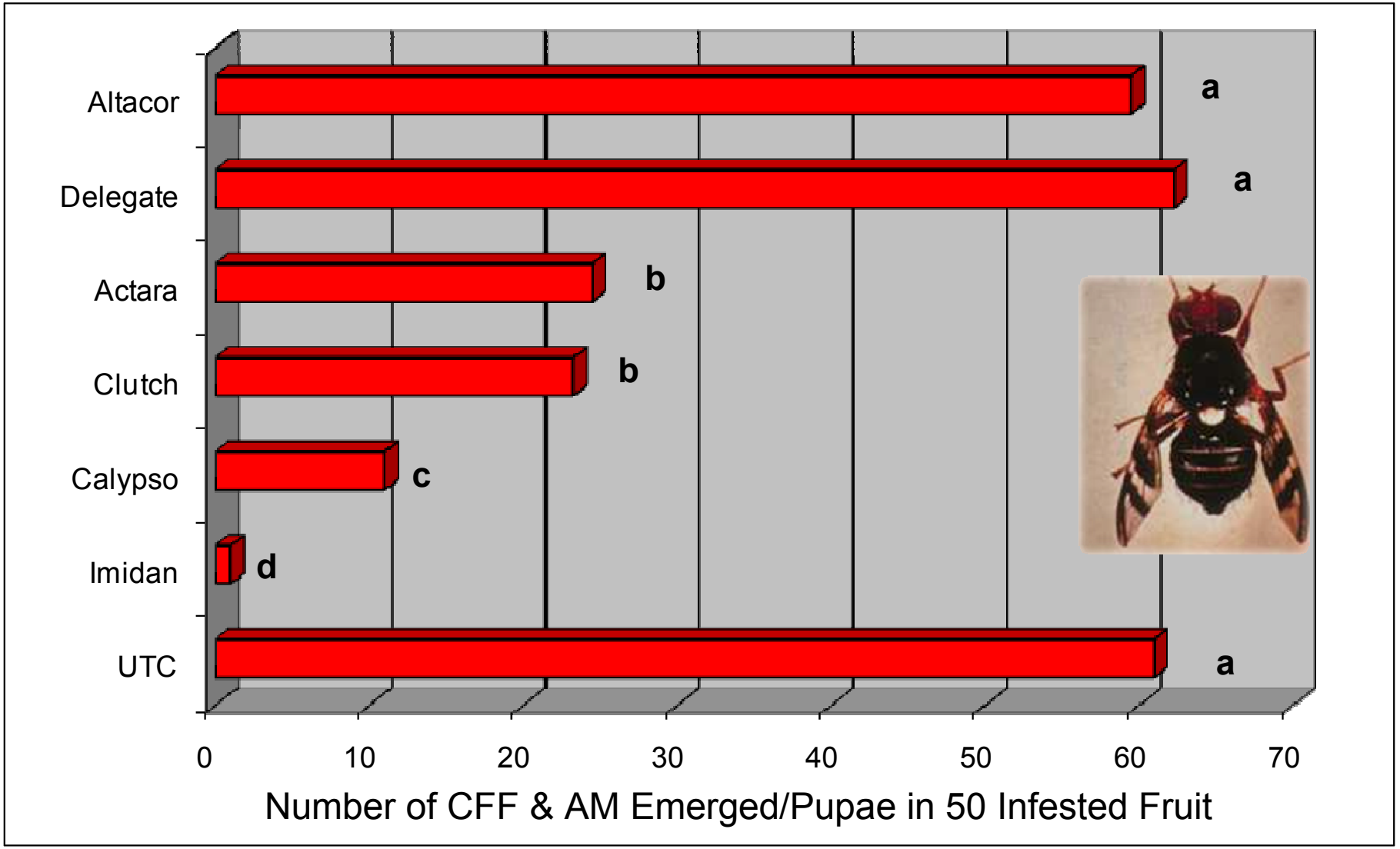
Curative Activity of Insecticides on Cherry Fruit & Apple Maggot Fly Indicates Some Penetration…

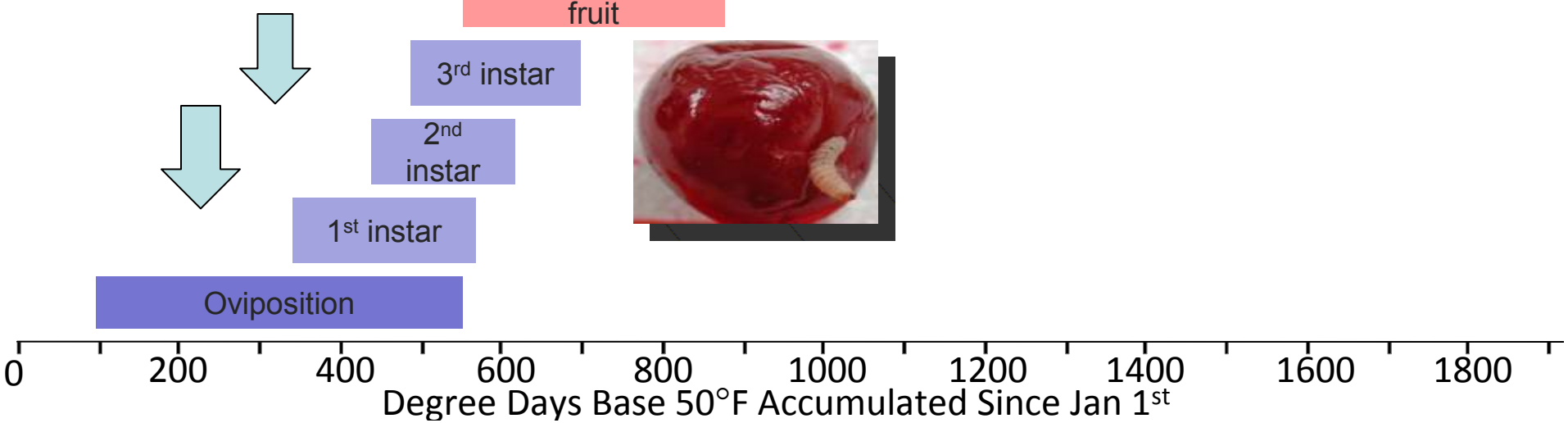
John Wise TNRC



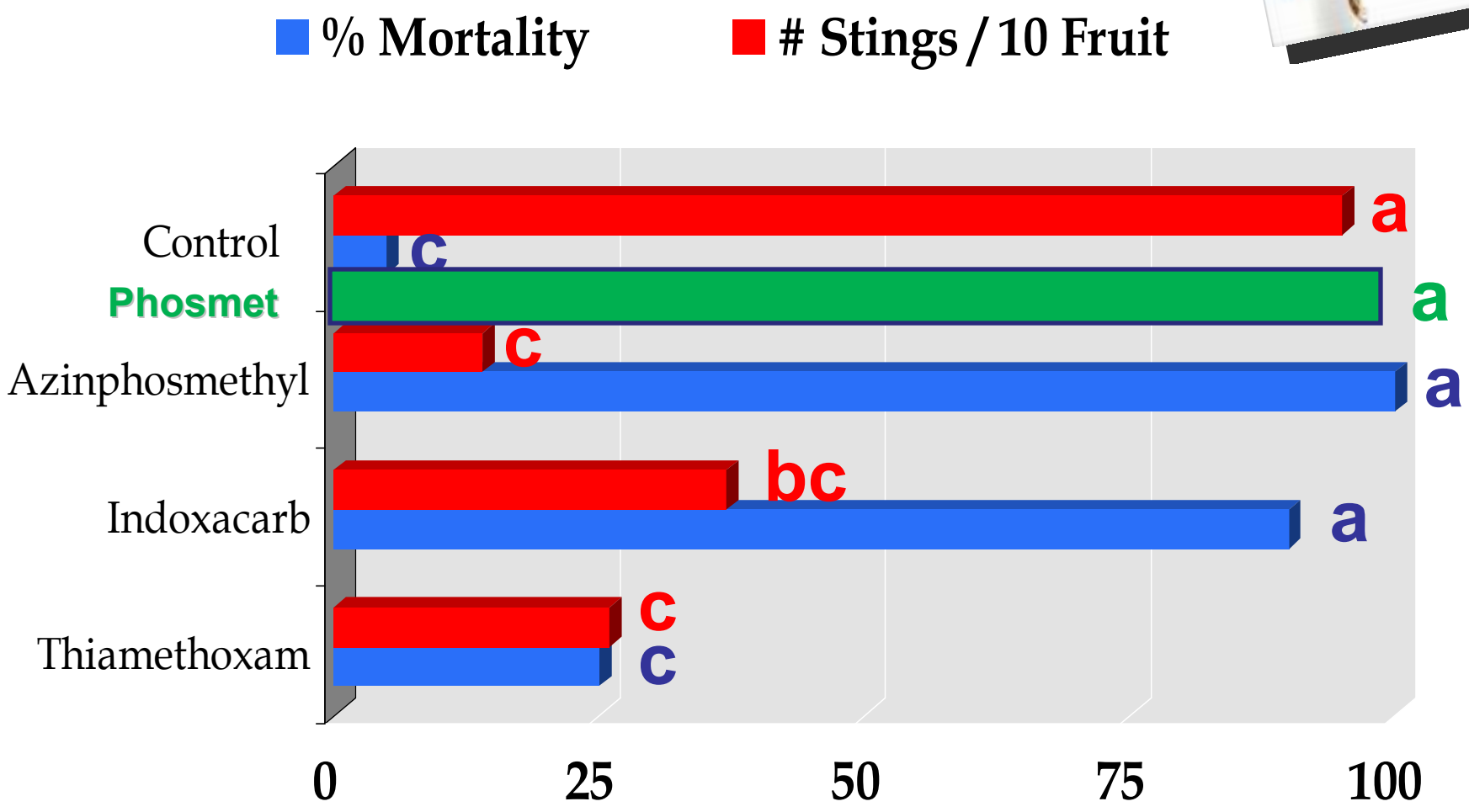
Control of Cherry Fruit Fly in Tart Cherries

Plum Curculio **Early Season Targets** Based on Degree Days

Adulticide
And / Or
Target eggs & larvae

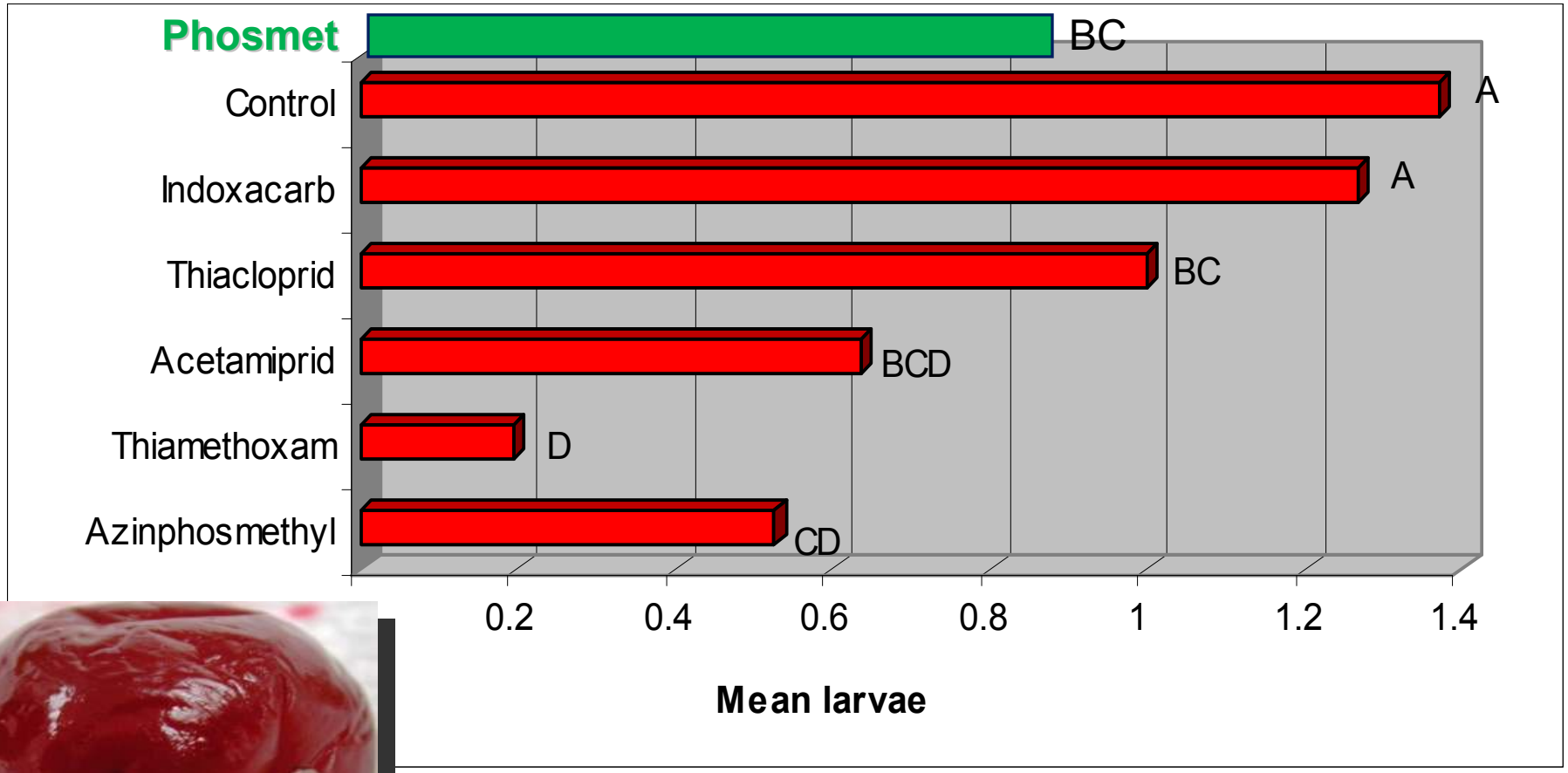


7 Day Activity on Adult Plum Curculio



2002 PC adult bioassay, 7 days post-spray, TNRC (P= .05, LSD)

Curative Activity on Plum Curculio Larvae
Imidan is Weaker on PC Larvae: Penetration



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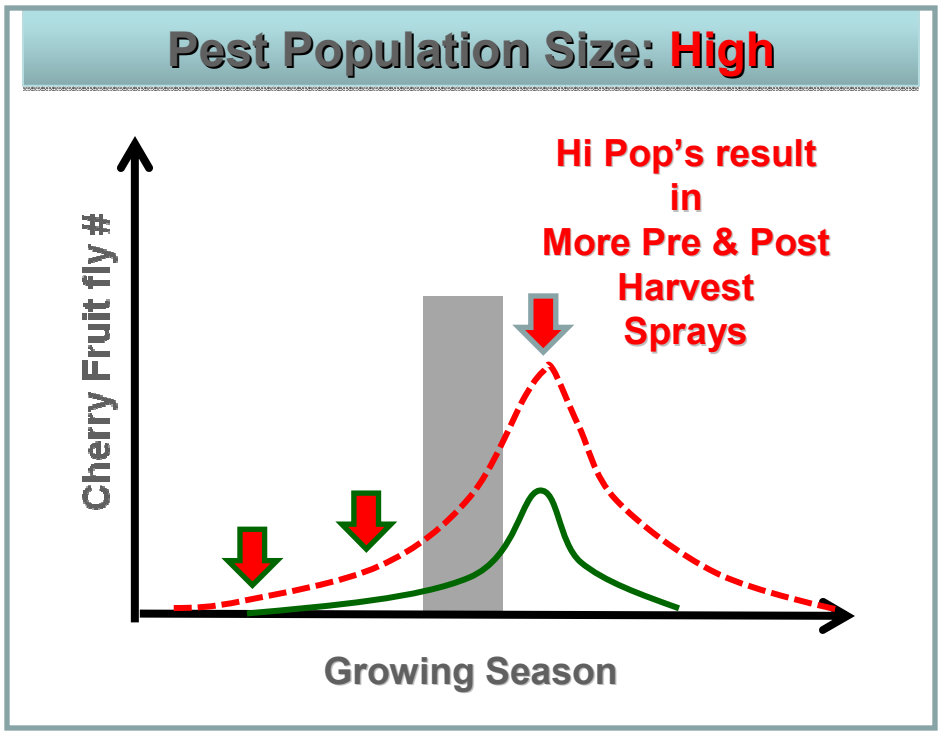
Post Harvest Cherry Fruit Fly May be Necessary

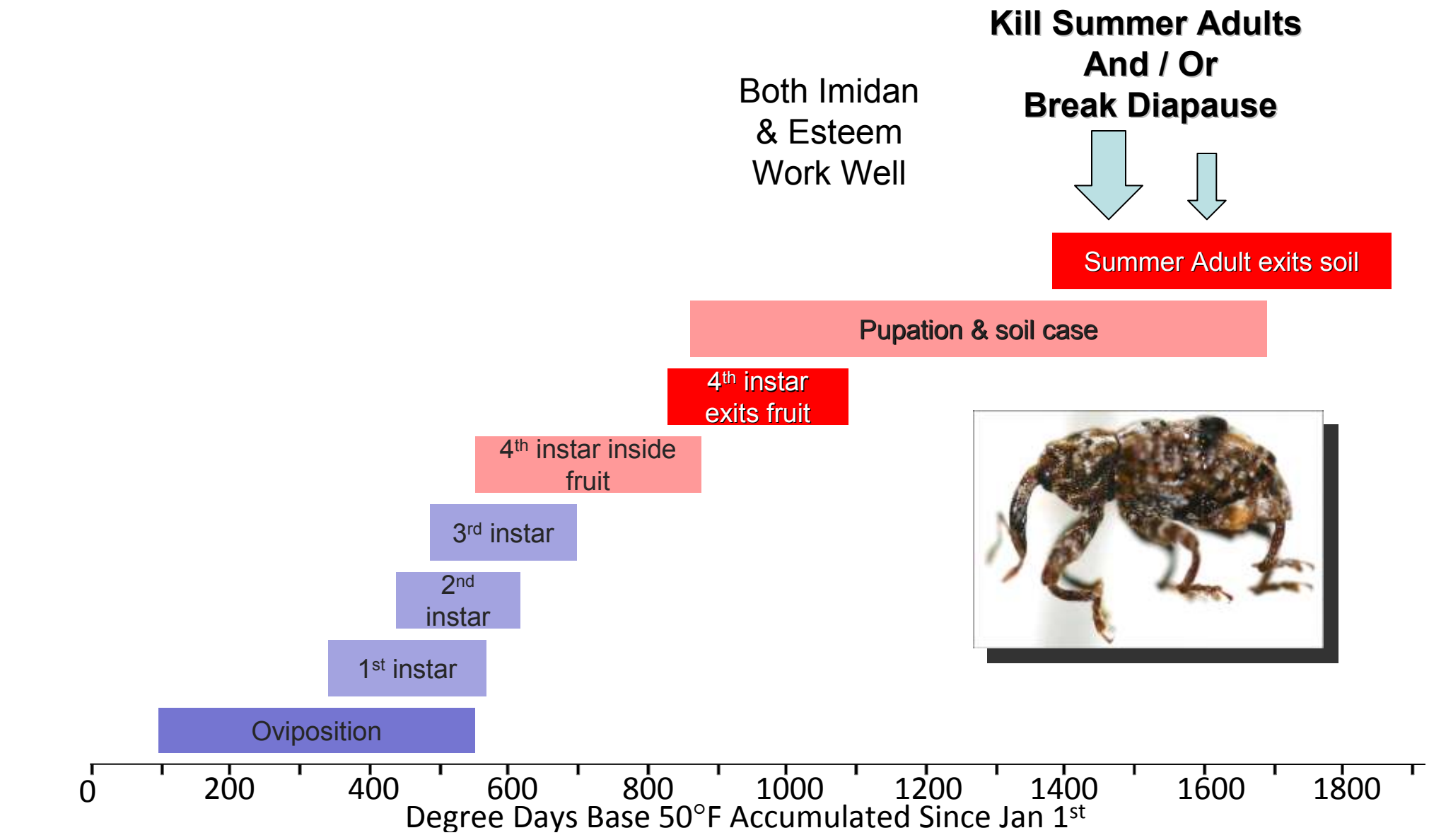
- Time Spray with Post Harvest Disease Control
- Post Harvest Spray will reduce the next year's population



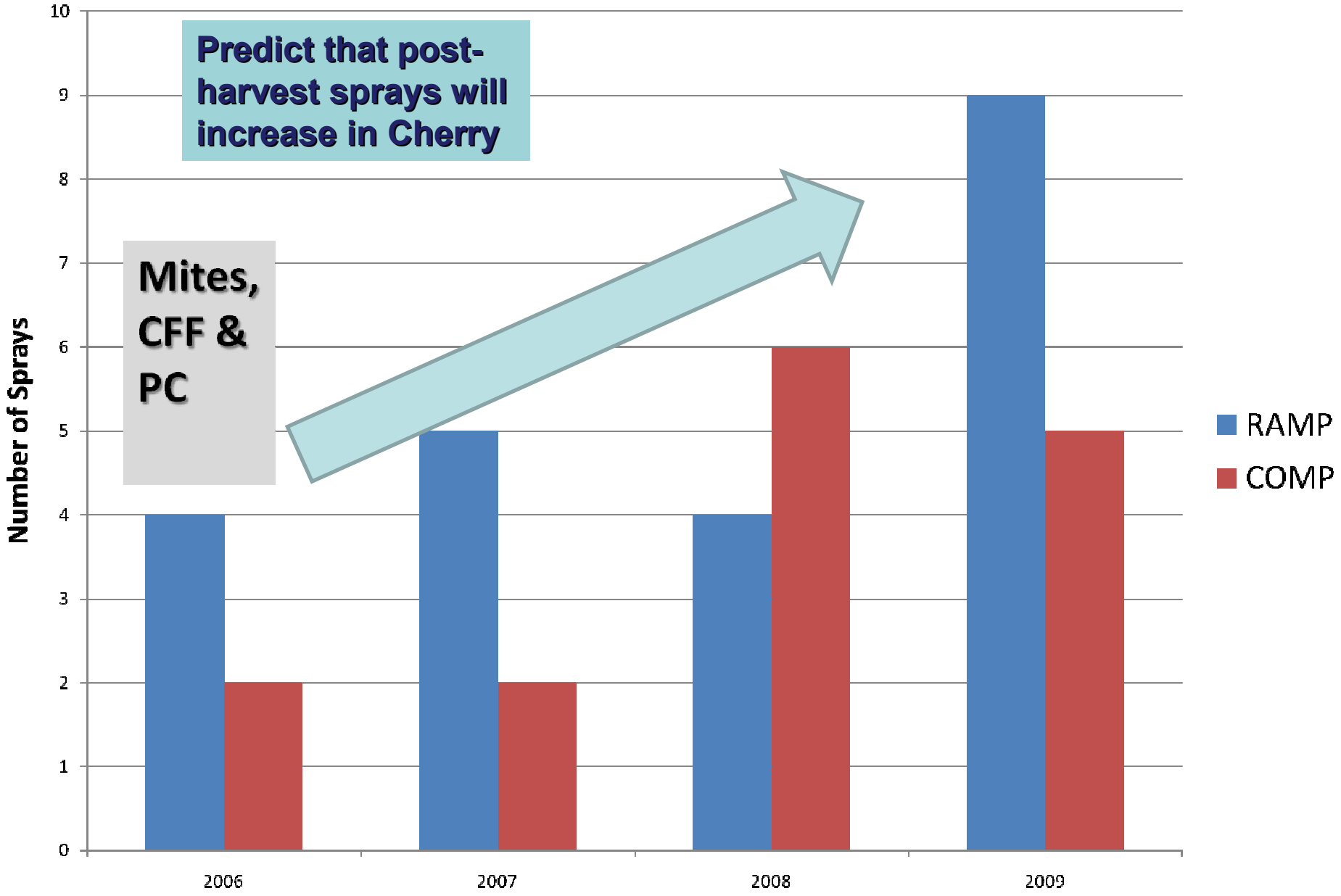
Plum Curculio **Post Harvest Spray** Phenology

Kill Summer Adults And / Or Break Diapause

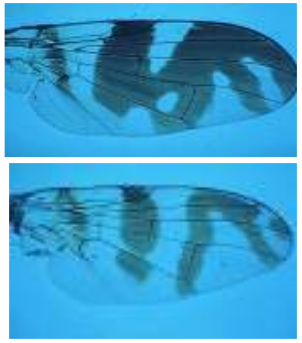
Both Imidan & Esteem Work Well

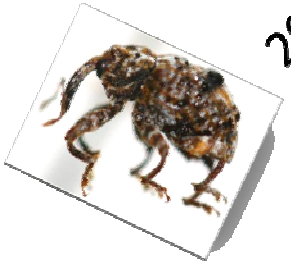


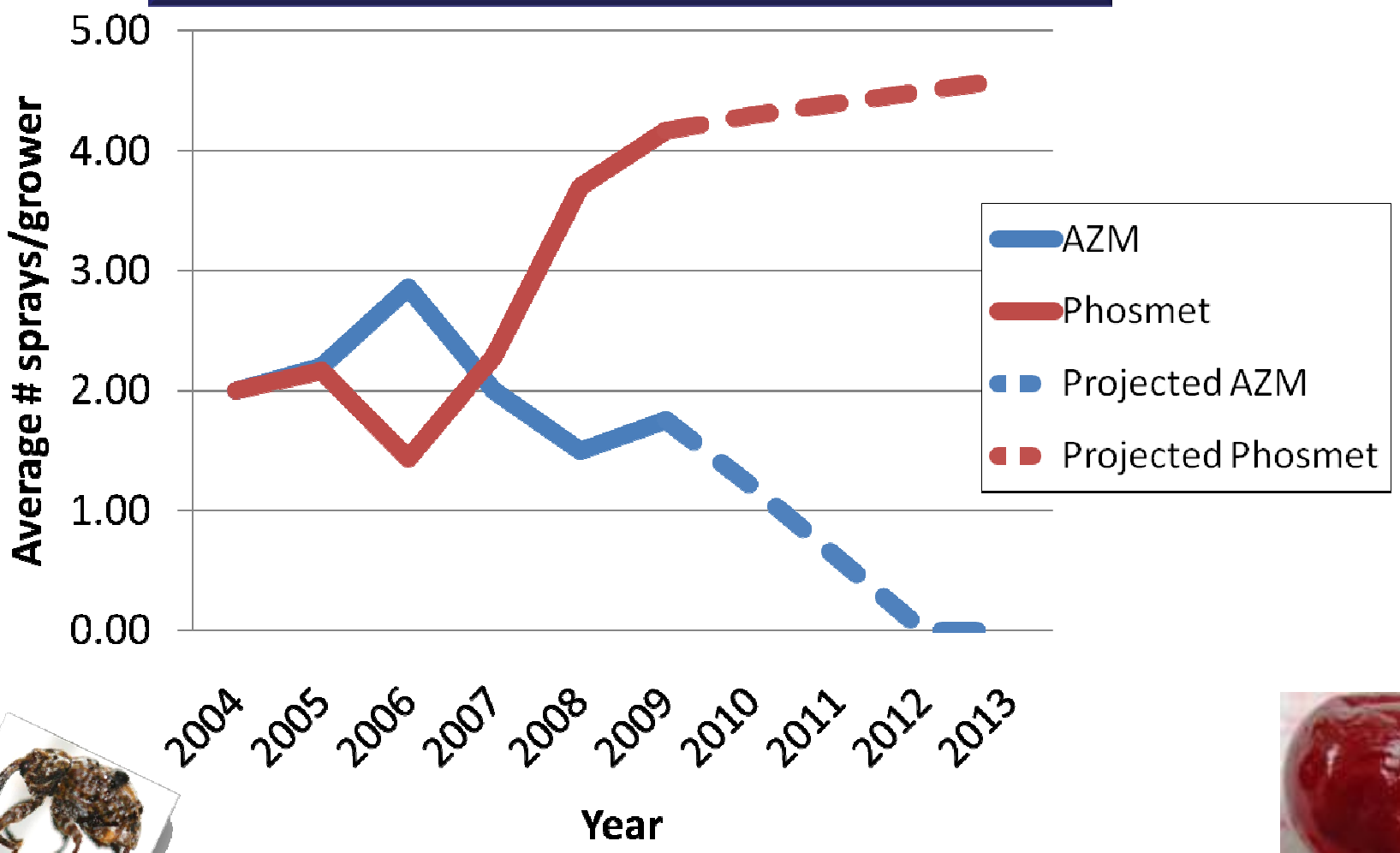
TREND: RAMP Post Harvest Sprays



Cherry Grower Insecticide Use: AZM and Phosmet







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Max Residue Limits

- **EPA- No Effect Level- NOEL**
- **Rule of Thumb:**
  - 1ppm = 1.0oz in 62,500 lbs
- **International: Codex Alimentarius**
  - **Global Process**
  - **Sets Max. Residue Limits**
- **Historically Processor Problem**
- **Imidan has problems**
  - Japan, S. Korea & ? EU

EPA Risk = Toxicity x Exposure

Margin of Exposure (MOE) =

Threshold below which EPA will not let a compound be used…**AZM**

MOE > 100 = No Effect Level / dose

Dose = Exposure x Time x Absorption

Body Wt

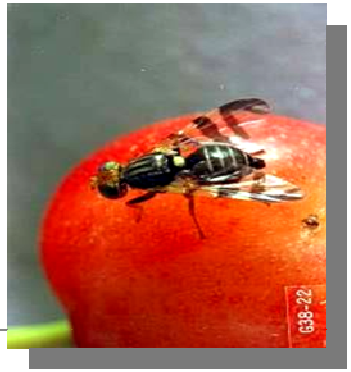
Imidan has a MOE Challenge in some Orchard use scenarios

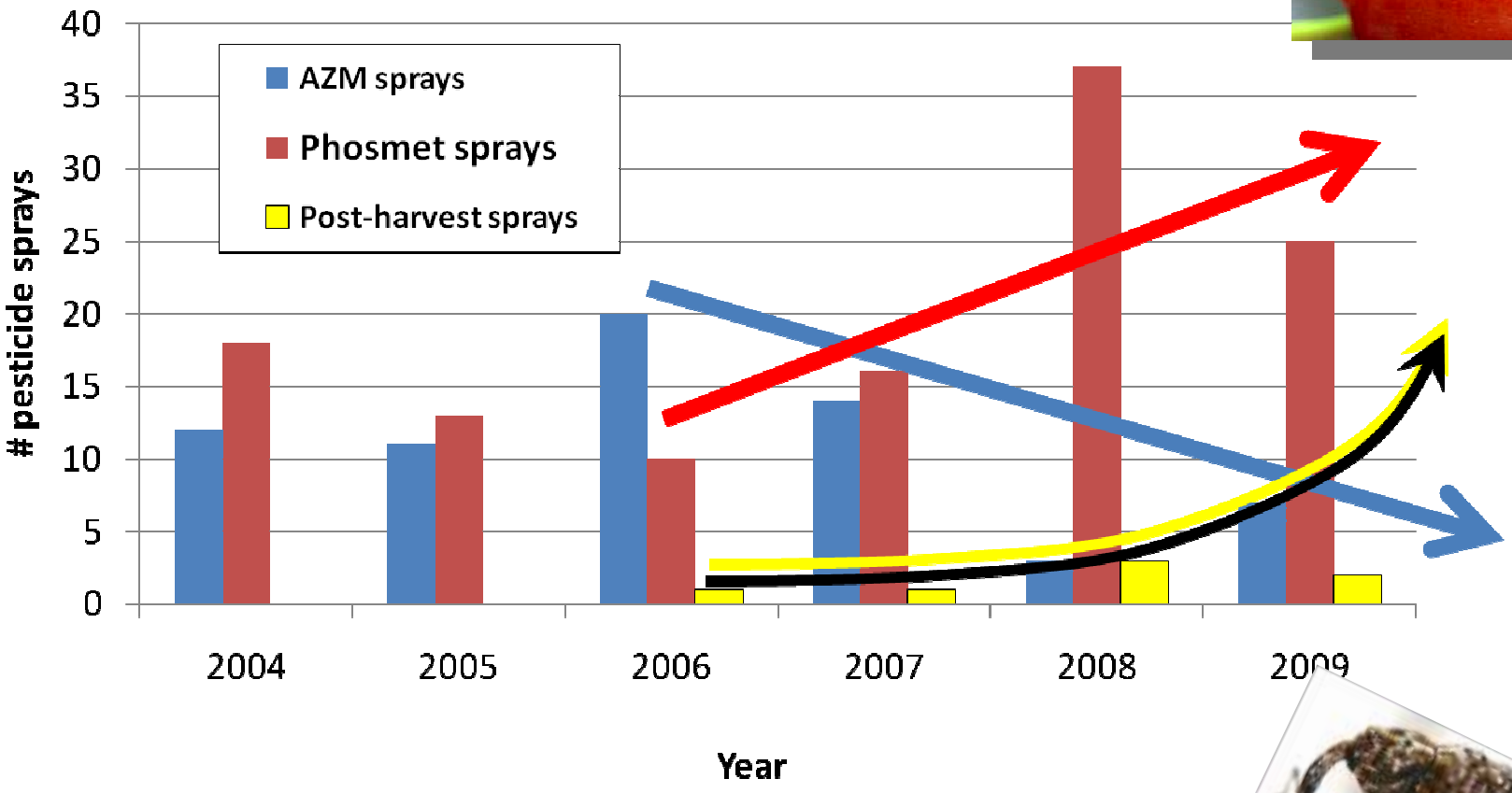
Imidan: One of the Last OPs Standing

- Get your pH 5.5 right or forget using it!
- Russets Sweets
- Excellent on Cherry Fruit Fly
- Excellent PC Adults, OK larvae
- Fruit Penetration: < than AZM
- Fits Post Harvest Window…
- MRL Issues in Japan, Korea & Maybe Europe
- Margin of Exposure EPA

- Resistance
  -OBLR
  -May want RM Future
- Likely good on Mineola moth…
- Not likely to flare mites

Number AZM & Phosmet Applied 2004-2009
RAMP Study: Comparison Blocks





*Data taken from 9 growers 2004 - 2007, 10 growers 2008-2009
**Post-harvest sprays of AZM and Phosmet only