

An In-depth Look at the Efficacy of New Insecticides on Tree Fruits

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Old Tool - AZINPHOS-METHYL SITUATION:

- ◆ PEACHES - no further use after Sept 30, 2006
- ◆ APPLES: Driven by worker exposure and ecological concerns - EPA stated their final ruling - Nov '06
- ❖ 2007: 8 lbs. maximum total formulated product per acre
- ❖ 2008 and 2009: maximum 6 lbs. total formulated product per acre - Present label
- ❖ 2010: 4 lbs. maximum total formulated product per acre
- ❖ 2011 and 2012: 3 lbs. maximum total formulated product per acre

Relative Efficacy of Older Insecticides in PA

<u>Common Name</u>	<u>Codling Moth</u>	<u>Oriental Fruit Moth</u>	<u>Leaf- rollers</u>	<u>Apple Maggot</u>	<u>Plum Curculio</u>
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Guthion	E	E	F-E	E	E	Res.
Imidan	G-E	G-E	F-G	G	E	Res.
Sevin	F	F-G	P	F	P-F	
Lorsban	—	E	E	—	—	



OP/SP- Alternative Insecticides – CM/OFM

<u>Insecticide</u>	<u>Class</u>	<u>Activity</u>	<u>Stage of Attack</u>
Assail Calypso Clutch	Neonicotinyl ↓	Disrupt nerve transmission ↓	egg(topical)/larvae ↓
Esteem Intrepid Rimon	Insect growth reg. ↓	Juvenile hormone mimic Molt accelerator Chitin inhibitor	egg(topical/residual) ↓ larvae(Intrepid only)
Delegate Spintor	Spinosyn ↓	Disrupt nerve transmission ↓	larvae
Proclaim	avermectin	↓	larvae
Altacor, Voliam flexi Belt	anthranilamide	Disrupt muscle action	larvae
Virus-Cyd-X -Carpovirusine BT	Biological ↓	viral infection ↓ bacterial infection	larvae ↓

A Management Program for CM/OFM:

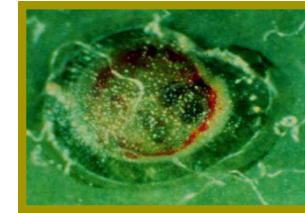
should consider:



Adult



Larvae



Eggs

- ✓ Targeting as many life stages as possible
- ✓ Using products with different modes of action
- ✓ Rotating insecticide chemistries to prevent resistance (i.e., between generations)
- ✓ Supplementing insecticides with mating disruption

Ideal Management Program for CM/OFM:

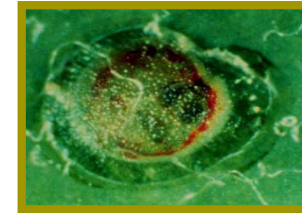
GOAL: to interrupt CM and OFM life cycles in as many places as possible.



Adult



Larvae



Eggs

- ✓ Reduce oviposition with MD and adulticides
- ✓ Use ovicides to kill eggs
- ✓ Use larvacides to kill larvae
- ✓ Use viruses or insect growth regulators that affect this generation and next generation
- ✓ Biological control agents that attack all stages within and outside the fruit

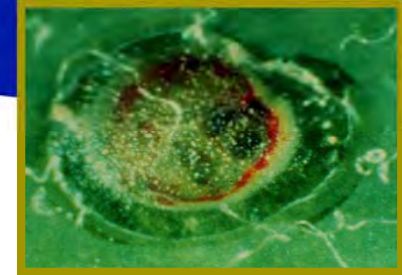
Reducing Oviposition of CM/OFM:



OFM



CM



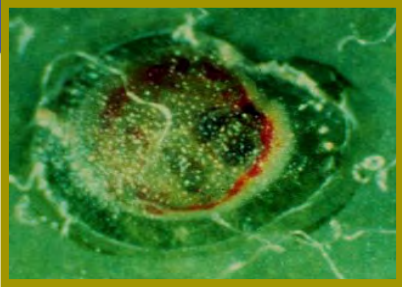
Eggs

- ✓ Mating disruption products -- many on the market



- ✓ Adulticides -- best examples include:
 - Pyrethroids, Avaunt® (repellency?)
 - IGR's - Intrepid®

Ovicides for CM/OFM:



Eggs

- Most OFM eggs laid on the fruit 2-4th Br.
- CM eggs mostly on spur lvs next to fruit (1st Br)
2nd Br - spur leaves & fruit

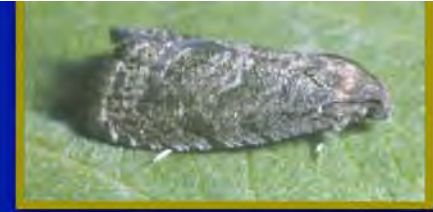


- ✓ IGR's -- Esteem®, Intrepid®, and Rimon®
 - Product residue should be present before eggs deposited/residual control also
- ✓ Altacor?
- ✓ Neo-nicotinoids -- Assail®, Calypso®, Clutch®
 - Effective if applied topically to eggs
- ✓ Horticultural oils (min. 1%)
 - Applied topically to eggs (e.g., 3x's per generation)

Larvacides for CM/OFM:



Larvae



Larvacides (most common - apply @ start of egg hatch)

- ✓ OP's, pyrethroids, Altacor®, Belt®, Delegate®
- ✓ Neo-nicotinoids - Assail®, Calypso®, Clutch®
- ✓ Intrepid® (some injury does occur, affects next generation)
- ✓ Granulosis virus (Cyd-X®, Carpovirusine®) - limited fruit protection initially (i.e., "stings" occur), greatest effects occur in next generation