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
WHAT & WHEN of Internal Worm Control

If using insecticides and/or MD for control - consider the following:

- Choice of products - efficacy and $$
- Rate of the products
- Optimum timing of the products
- Method of application
- Water volume and coverage
- Rotate insecticide chemistries between broods where possible
- Pheromone mating disruption
# Relative Efficacy of Older Insecticides in PA

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Codling Moth</th>
<th>Oriental Fruit Moth</th>
<th>Leaf-rollers</th>
<th>Apple Maggot</th>
<th>Plum Curculio</th>
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<td>Imidan</td>
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<td>SpinTor</td>
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<td>G-E</td>
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</tbody>
</table>

E=Excellent, G=Good, F=Fair, P=Poor

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L. A. Hull 2008
Within 1 to 24 hours of hatch, the larva will enter a shoot or fruit.

Key to control: The egg or the larva must contact the insecticide either via contact or ingestion before entry. Once inside, the larva cannot be killed unless it exits the shoot/fruit.
New Insecticides - Internal Worm Control

✓ Altacor™ (Rynaxypyr, also DPX-E2Y)
   DuPont Co.

✓ Belt™ (Flubendiamide, also NNI-0001)
   Bayer CropScience

✓ Delegate™ (Spinetoram), also XDE-175)
   Dow AgroSciences

✓ Voliam flexi™ (Chlorantraniliprole + Thiamethoxam)
   Syngenta
Crops and pre-harvest intervals (PHI):
Pome fruit (7d PHI); bushberries (3d PHI); caneberries (1d PHI); tree nuts (14 d PHI), grape (7d PHI); stone fruit (1d PHI on nectarines, 7d PHI on cherries, plums and prunes, 14 d PHI on peaches).

Pests (control):
Codling moth, oriental fruit moth, obliquebanded leafroller, tufted apple bud moth, thrips, leafminers, grape berry moth, cherry fruitworm, loopers, pear psylla

Pests (suppression):
Apple maggot, plum curculio, blueberry maggot, currant fruit fly

Recommended rate(s):
From 4.5 to 7 oz per acre depending on pest and pest pressure.

♦ REI requirements: 4 hours
Altacor™

Mode of Action and Symptomology

- Ryanodine receptor agonist
- Regulates release of stored calcium
- Primary route of exposure is through ingestion
- IRAC Group 28 Insecticide

Muscle contraction and paralysis

Rapid feeding cessation

Immobility

Death within ~ 72 hours

Crops - Apple, Pear, Stonefruits, Grapes
Targeted Pests (apple/peach) -- codling moth, OFM, leafrollers, STLM

L. A. Hull 2008
Targeted Insect Pests in Fruit (Apple/Pear)

- Codling moth
- Obliquebanded leaf roller
- Tufted apple bud moth
- Green fruitworm
- Spotted tentiform leafminer

- 3-5 oz/acre
- 3 applic/season
- 15.0 oz/acre for the season
- 14 day PHI