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Codling Moth Management Keeping on Track

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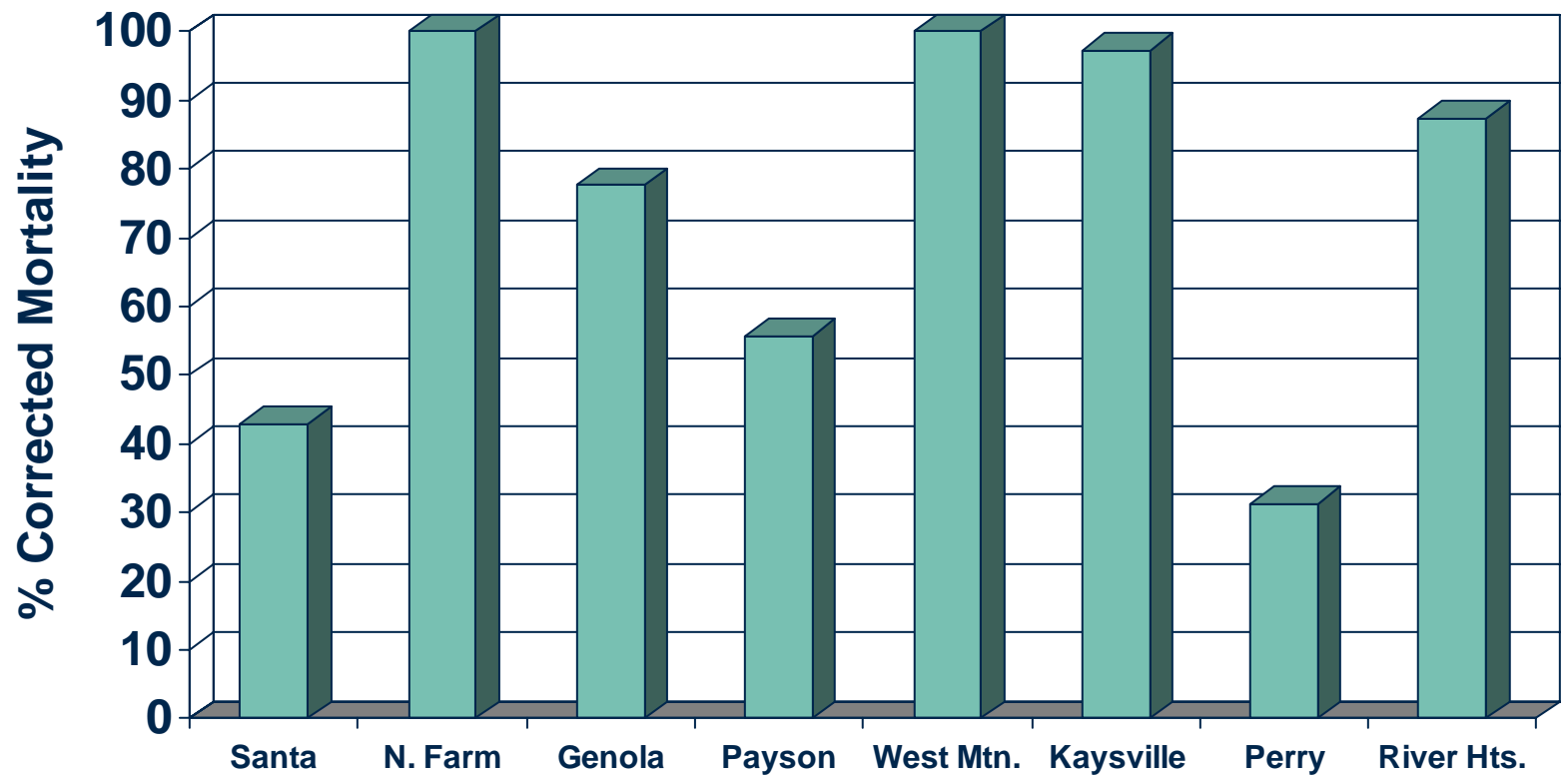
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2003 – A Tough CM Year

- **High CM populations**
 - How to reduce numbers
 - Mating disruption
 - Effective insecticides
 - Effective timing, rates, coverage
- **Insecticide resistance**
 - Guthion – Organophosphate
 - Danitol – Pyrethroid
 - Concern for cross-resistance to “new” insecticides
- **No stand alone controls anymore**
 - Current strategy – combination of tools
 - No wiggle room – You have to be right on

2001 Survey of Guthion Resistance in Codling Moth



← Utah County → Davis Co. Box Elder Co. Cache Co.

The background of the slide is a photograph of four yellow apples with some red blush, resting on a dark wooden surface. The apples have several brown, circular spots on their skin, which are characteristic of codling moth damage. The text is overlaid on the top half of the image.

Insecticide Resistance Management

- **Rotate insecticide classes**
 - Different modes of action
- **Avoid insecticides to which CM in your orchards is resistant**
 - Don't use materials with resistance first/use as a follow-up spray

Insecticides Registered on Apple for Codling Moth

- **Organophosphates**
 - Guthion, Imidan, Diazinon, Malathion
- **Carbamates**
 - Sevin, Lannate
- **Pyrethroids**
 - Danitol, Ambush, Pounce, Asana
- **Chloronicotinyls/Neonicotinoids**
 - Assail, Calypso
- **Oxadizine**
 - Avaunt
- **Fluorine**
 - Cryolite
- **IGRs**
 - Ecdysone Agonists
 - Intrepid, Confirm
 - Chitin Synthesis Inhibitors
 - Diamond (Dimilin-pear)
 - Juvenile Hormone Mimics
 - Esteem
- **Biologicals/Microbials**
 - Bt, Success/Entrust, CM Virus
- **Botanicals**
 - Pyrethrin, neem, garlic oil
- **Physical**
 - Oils, soaps
- **Pheromones**

Utah CM Control Trials

Year/Crop	Insecticide Program	% Injury 1 st gen.	% Injury 2 nd gen.
2003 Apple	Diamond (4) Guthion (2)	5.3%/1.4%w	8.3%/1.3%w
	Check	33.8%	62.6%
2003 Pear	Assail (4)	MITES	6.3%/0.3%w
	Check		36.0%

Utah CM Control Trials

Year/Crop	Insecticide Program	% Injury 1 st gen.	% Injury 2 nd gen.
2002 Apple	Calypso (6)	9.8%/0.3%w MITES	1.8%/0%w
	Diamond (6)	6.8%/0.3%w	0.8%/0%w
	Guthion (4)	8.3%/0.3%w	0.9%/0.3%w
	Check	9.2%/2.3%w	7.3%/5.9%w
2001 Apple	Guthion (2) Intrepid (2)		0-4%/0-2%w

Utah CM Control Trials

Year/Crop	Insecticide Program	% Injury 2 nd gen.
2000 Apple	Calypso (6)	1.6%/1.3%w MITES
	Guthion(2) Intrepid (2)	1.0%/0.7%w
	Guthion (4)	0.5%/0.3%w
	Check	22.5%/21.8%w

The background of the slide is a photograph of four apples. The apples are light yellow with some red blush and several prominent brown spots, likely from insect damage or rot. They are arranged in a cluster on a dark, textured surface.

CM Control Programs with Promise for Utah

- **Pheromone Control (MD, AttKill)**
 - To take the top off the population, reduce numbers
- **Neurotoxin insecticide – IGR rotation**
 - OP, Pyr, Neo – IGR
- **Suppressants (early, mid or late)**
 - Physicals, Biologicals, Botanicals



CM Control Options

- **Ovicides: Intrepid, Diamond, Esteem**
 - Apply before eggs laid (50-75 DD), repeat 14-21 d
- **Oil (suffocant) – over the top**
 - 200, 400, 600 DD (50-60% suppression)
- **Larvicides:**
 - Apply at 250 DD, reapply 14-21 d
 - Traditional ones kill larva as crawl across residues and upon ingestion
 - New ones act only upon ingestion: Assail, Calypso, Intrepid, Diamond, Virus
- **All work better if used with pheromones to**



Steps to Successful (Better) CM Management

1. **Lower the CM population (egg load)**
 1. Mating disruption
 2. 1st cover spray – effective & well-timed insecticide
 3. No skimping / may take several years
2. **Use multiple tools (tactics) with multiple modes of action**
3. **Avoid/reduce use of insecticides where resistance is a problem**
4. **Hit 1st generation hard, then keep control pressure on for remainder of season (can't relax)**
5. **Trap – to time sprays & to follow moth numbers**

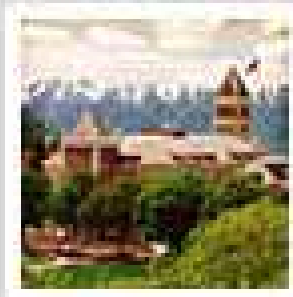
The background of the slide is a photograph of four apples resting on a dark, vertically-grained wooden surface. The apples are light yellow with some red blush. Each apple has a prominent brown, circular spot on its surface, likely from a pest or disease. The text is overlaid on this image.

Steps to Successful (Better) CM Management

- 6. Ensure good coverage & full rates of insecticides**
- 7. Sanitation – in-season & over-wintering larvae**
- 8. 3rd generation – occurring more frequently (can't relax 'til it's over)**

On-Farm Testing

- **Must** develop experience with new tools & how best to implement them
- **USU Extension** wants to work with you



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