Life Without Lorsban

Jay Brunner & Mike Doerr
Washington State University
Tree Fruit Research and Extension Center

Reality Check

- EPA has banned the use of Lorsban (chlorpyrifos) in the post-bloom period on apple after December 31, 2000.
- Use of Lorsban (chlorpyrifos) is still allowed in the pre-bloom period.
- Historically 80-90% of Lorsban use has been in the pre-bloom period

Lorsban-basic facts

- Active ingredient-chlorpyrifos
- Neuroactive organophosphate
  - Achase inhibitor similar to Guthion
- Broadspectrum control of many insect pests
  - Ag. use as Lorsban 4E, 50 WP or 75 WDG
  - Home and garden use as Dursban

Lorsban-summer uses

- Leafroller
  - Long-time emergency product
  - Recently less effective
- Codling Moth
  - Negative cross-resistance
- Lacanobia fruitworm
  - Best product
- San Jose Scale
  - Crawlers timed with degree day model
- Woolly Apple Aphid

Leafroller alternatives

- Bt- “old”product
- Success (spinosad)- 1998
- Confirm, Intrepid- 1999/2000
- Esteem-1999
- Pheromones- MD and A&K
- Surround- effects behavior

B. thuringiensis

- Bacterial insecticide
- Effective and cheap
- Specific to lepidopteran
  - Alkaline gut
  - Highly selective
- Target young larvae
  - Actively feeding
  - 10 d residual
- Sublethal effect on normal phenology

Success (spinosad)

- Fermentation of bacteria
- Neuroactive
  - hyperactivity of NS
  - Na channel vs. Achase inhibition
- 1° stomach poison
  - Moderately selective
- Target young larvae
  - 14 d residual
- Danger of resistance

Confirm/Intrepid

- New IGR
  - Molt accelerating compounds
- Stomach poison
  - Very selective
  - Lepidopteran only
- Intrepid more active
  - No foreign tolerances

Esteem (Knack)

- New IGR
  - Juvenile hormone mimic
  - Similar to Comply (fenoxycarb, Insegar)
- Stomach poison or ovicide
  - Very selective
- Use at PF
  - Kills larva at molt to pupa

Pheromones

- Mating disruption
  - Suppression only
  - Highly specific
  - Testing new delivery systems
    - Puffers, sprayable
- Attract and kill
  - Pheromone + insecticide
  - Species specific
  - Issues remain regarding application

Surround (kaolin)

- Effects behavior
  - Colonization of young larvae
  - Oviposition of adults?
  - Some mortality
- Additive effect of multiple applications
- Moderately selective
  - Mites
  - Leafminer parasitoid

Codling moth alternatives

- Guthion
  - Not free from regulatory concerns
- Imidan
  - similar regulatory concerns as Guthion
- Pheromones
  - Mating disruption and Attract & Kill
- Horticultural oils
- Esteem
- Confirm/Intrepid

Guthion

- Neuroactive (Achase inhibitor)
- Broadspectrum
  - Some natural enemies resistant
- Regulatory issues
  - FQPA (common modes of action?)
  - Worker Safety Standards (14 d reentry?)
- CM resistance

Imidan

- Historically used less than Guthion
- Neuroactive (Achase inhibitor)
- Broadspectrum
  - Some natural enemies resistant
- Regulatory issues
  - FQPA (common modes of action?)
  - Worker Safety Standards (reentry not set)
- CM resistance

Pheromones

- Highly selective
- Several options of MD
  - Not all tested in Washington
- New delivery techniques
  - Puffers, sprayable
- Attract and Kill
  - Limited experience
  - Issues remain with delivery system

Horticultural oil

- High safety
- Highly selective
  - 1° effect on exposed eggs
  - May have some effect on behavior
- Multiple applications necessary
  - Concerns over plant health

Insect Growth Regulators

- Esteem (Knack)
  - 1° ovicide
    - Eggs must be laid on residues
    - Earlier application than Guthion (PF)
  - Experience limited
- Confirm/ Intrepid
  - Use as supplement to MD

San Jose Scale

- Diazinon
  - Still under action of FQPA
  - Neuroactive organophospate
    - Same MOA as Guthion
    - Aggregate exposure
  - Moderately selective
  - Not highly active against SJS
- Delayed dormant oil
- No new promising products

Lacanobia fruitworm

- Thiodan
  - Old chemistry at risk under FQPA
  - Neuroactive chlorinated hydrocarbon
    - Na channel vs. Achase
  - Moderately selective
    - Toxic to rust mites
  - Good against all larval stages
  - Export issues

Lacanobia fruitworm

- Success
  - Best against young larvae
  - Short residual activity (14 d)
- Confirm/Intrepid
  - Best against young larvae
  - Longer residual
  - Export tolerance issues

Lacanobia fruitworm

- Surround
  - Effects behavior of young larvae
  - Some mortality
- Ecozin
  - Neem product
  - Delayed mortality
  - More experience needed
- Bt- not effective
- Lannate and Asana
  - Effective against larvae
  - Very disruptive, not recommended

Woolly apple aphid

- Diazinon
- Dimethoate
  - High human toxicity
  - Highly toxic to most natural enemies
- Horticultural oil
  - Suppresses colonies

Detriments of Lorsban

- Negative effects on natural enemies
  - WTLM parasitoid (*P. flavipes*)
  - Leafroller parasitoid complex (*C. florus*)
  - Aphid predators
    - Campylomma, deraeocoris
- Neurotoxin
  - Worker safety issues

Future Hope ?

- Neonicitinoids (similar to imidicloprid)
  - acetamiprid (Assail):
    - Broader spectrum of activity, CM
    - OP replacement safer pesticide
    - Close to registration.
  - thiocloprid (Calypso):
    - Lepidopteran (CM, LR, Lacanobia) activity
    - Limited experience in WA.

Future Hope ?

- indoxicarb (Avaunt):
  - New insecticide chemistry
  - Neuroactive, Na channel (nerve activity).
  - Weak CM activity, good PLR activity, highly active against lacanobia
- emamectin benzoate (Proclaim):
  - similar mode of action as abamectin
  - Lepidoperan (CM and LR)

Future Hope ?

- CM granulosis virus (Carpovirusine)
  - registered in US, effectively used in Europe
  - Specific to CM
    - Other species affected by specific granulosis viruses
  - Potential supplement to MD.
- Triazamate (Aphistar):
  - Achase inhibitor
  - promising against woolly apple aphid
  - Somewhat selective to natural enemies
  - Registration possible in 2001

Future Hope ?

- Uncertain registration
  - chlorfenopyr (Alert):
    - New pyrole chemistry
    - Broad spectrum of activity
    - Very good leafroller control
    - Not selective
  - fenoxycarb (Insegar, Comply):
    - Juvenile hormone,
    - Very active against LR (last larval stage) and CM (eggs)
    - Registration questionable

Will there be Life Without Lorsban ?

Life Without Lorsban

- **Yes, there will be !**
- Movement to “soft”, selective pesticides
- Careful planning and monitoring
- Could be more expensive
  - Will require skill and expertise
- We need to learn how to use NEW products