



## **Controlling Codling Moth in Organic Pear Orchards**

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## **Organic and 'Super-soft' IPM Programs in Pear**

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## Outline

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- **Soft program for pear**
  - Not organic, but very soft
    - IGR-based IPM Areawide organic project
- **Organic program for pear**
  - and organic-ish
  - Organic insect pest management

## Background

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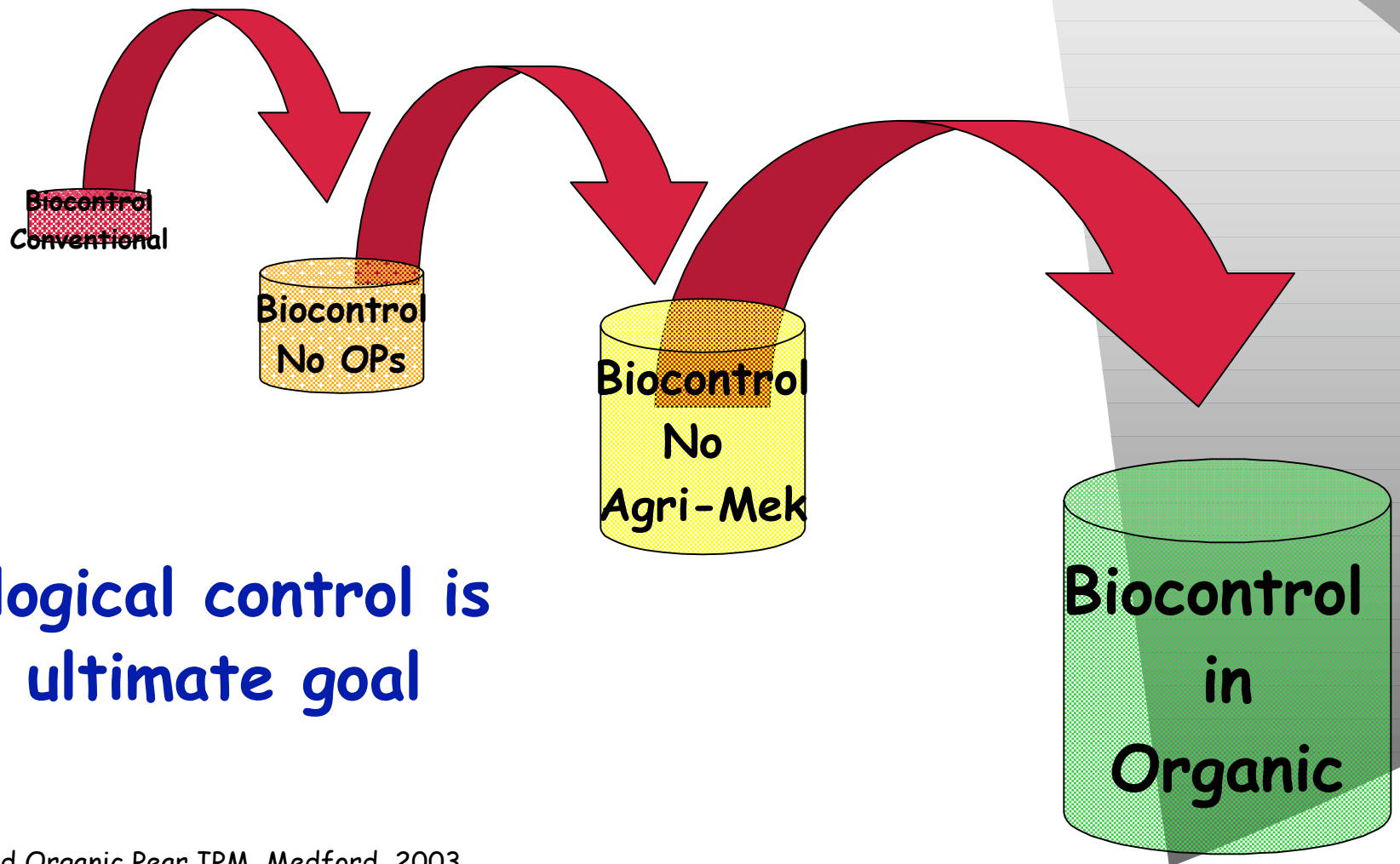
- **Areawide Codling Moth**
  - Areawide concept shown important for successful mating disruption
- **Areawide II Project**
  - Areawide concept applied to biocontrol
  - Tends to be pesticide-oriented
    - Reduction in insecticide load

## Pear Areawide II

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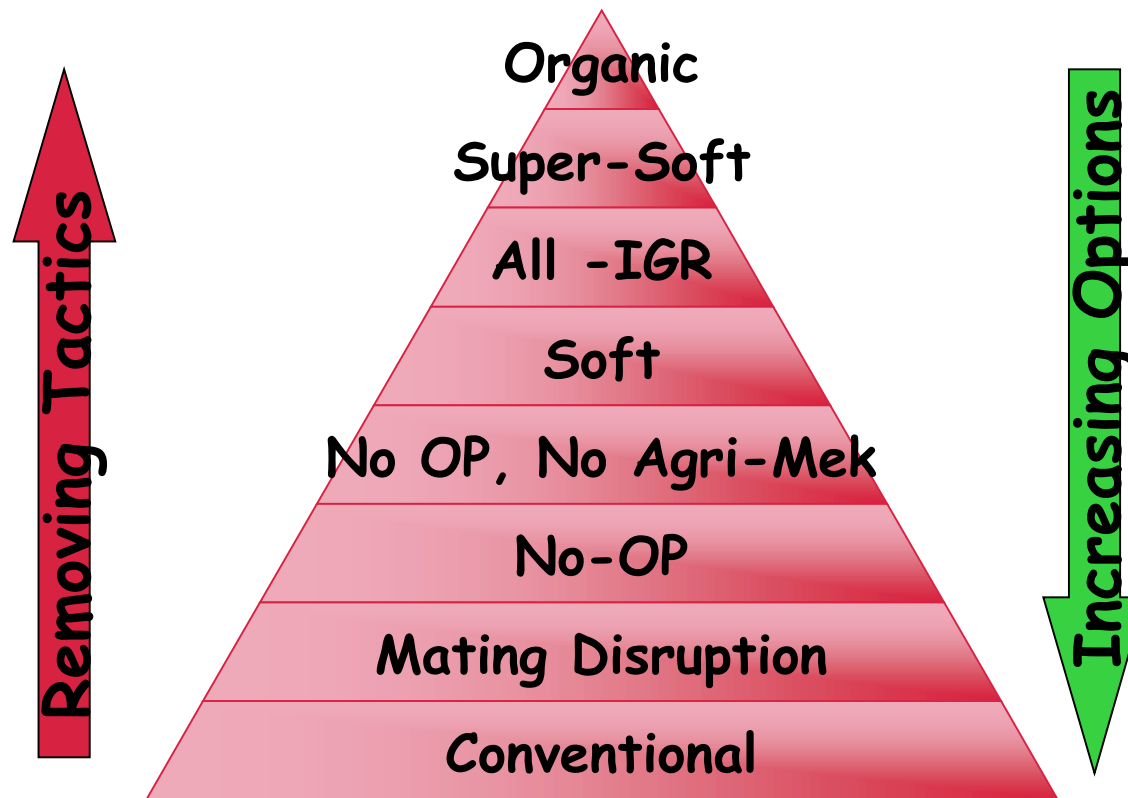
- No OP, no Agri-Mek
  - 2001
    - +OP+Agm, +OP-Agm, -OP+Agm, -OP-Agm
    - No differences in programs
      - Chloronicotinyls replaced the Agri-Mek
- 'All IGR All-the-Time Program'
  - 2002
  - Standard program vs IGR
    - IGR - No chloronicotinyls, no Agri-Mek, no OPs

## Stepwise improvement in IPM



- **Biological control is the ultimate goal**

# IPM Philosophy





## All-IGRs All-the-Time

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## Areawide II Program

John E. Dunley

Jay Brunner

Ted Alway

**WSU Tree Fruit Research and Extension Center**

Consultants

Fieldmen

Growers

## Design

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- **Six locations**
  - 3 in Wenatchee Valley area
  - 3 in Yakima Valley
- **Orchard size: 16+ acres**
  - Half the orchard in conventional program
    - Standard IPM for the area
  - Half the orchard using only IGRs
    - 8+ acre per side

Standard

All-IGR

## General program

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### Pear Psylla

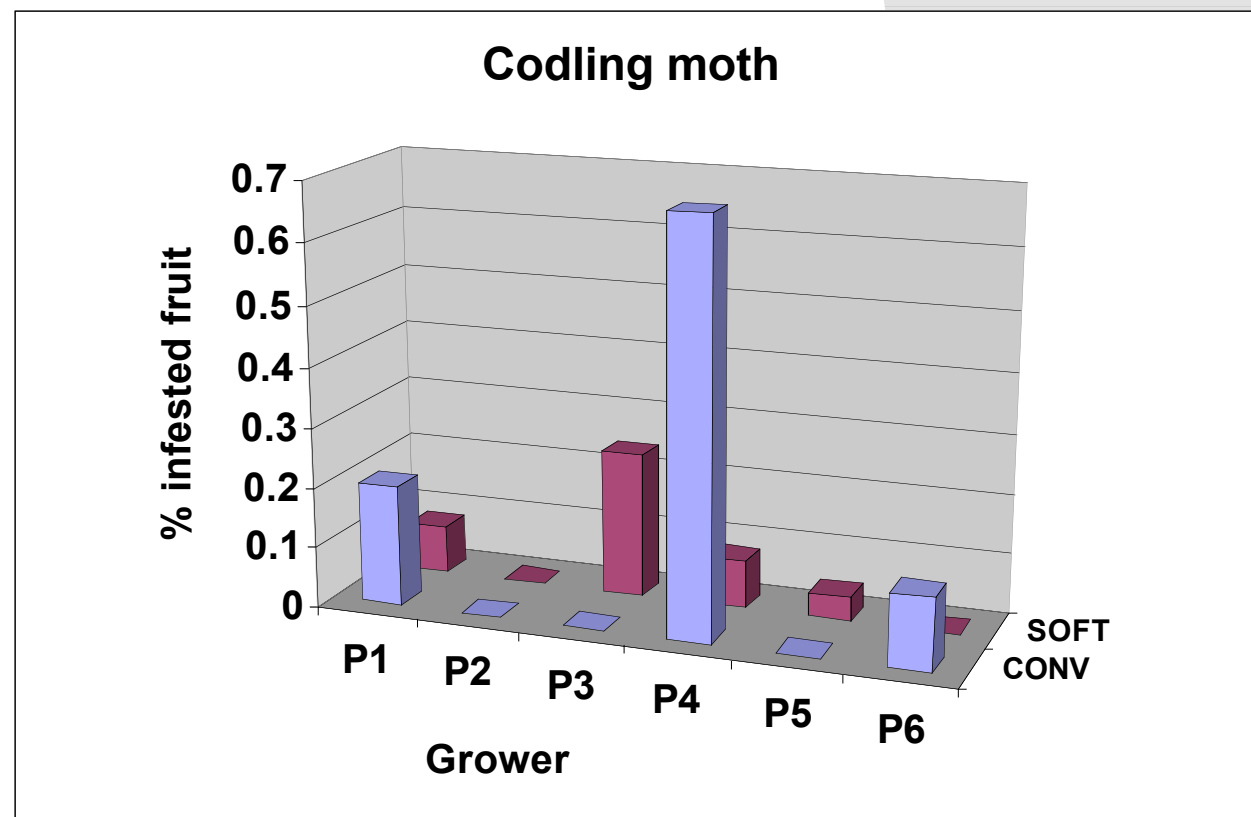
- Agri-Mek
- Provado
- Actara
- Assail
- Surround
- Esteem
- Dimilin
- Neemix
  
- Both used Acramite for spider mites

### Codling moth

- Guthion
- Imidan
- Mating disruption
- Intrepid
- Esteem
- Dimilin

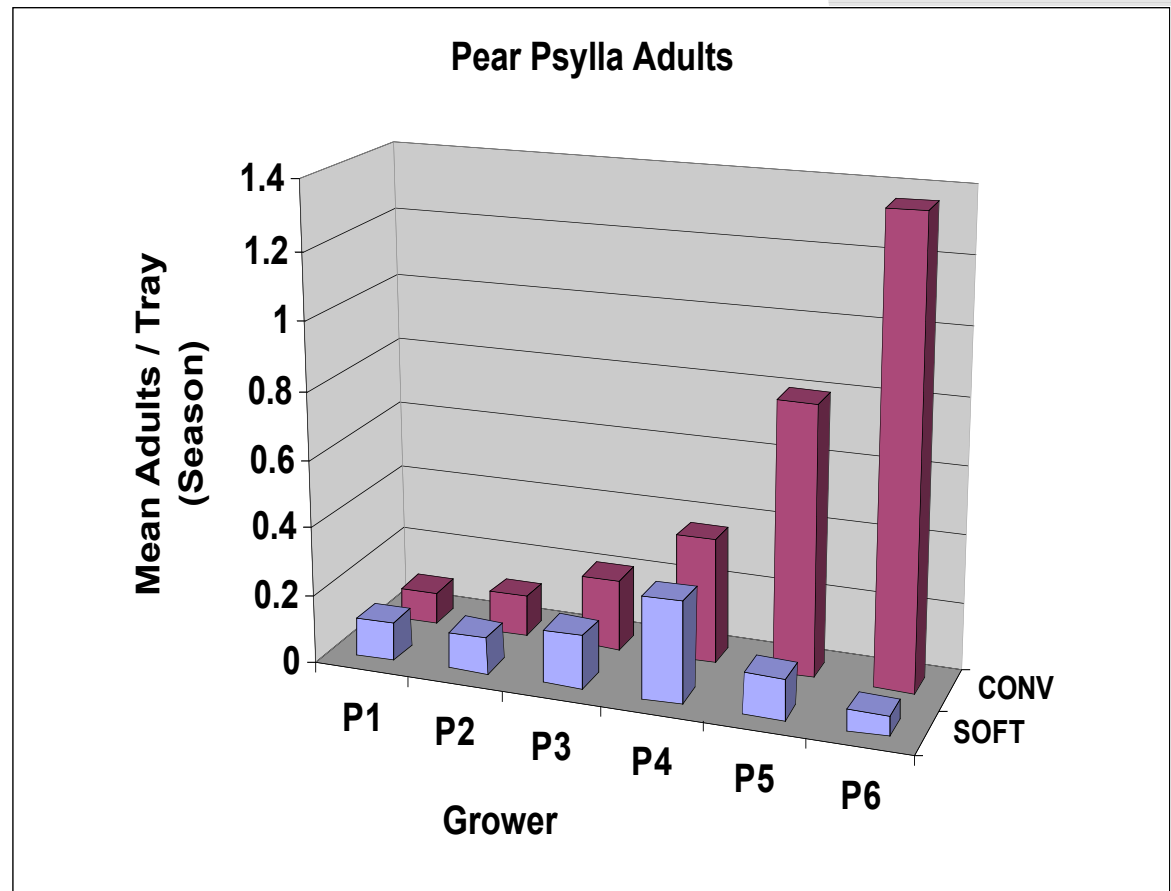
## Codling moth

- Codling moth generally the same
  - One spike in Conv. in Wenatchee (still low)



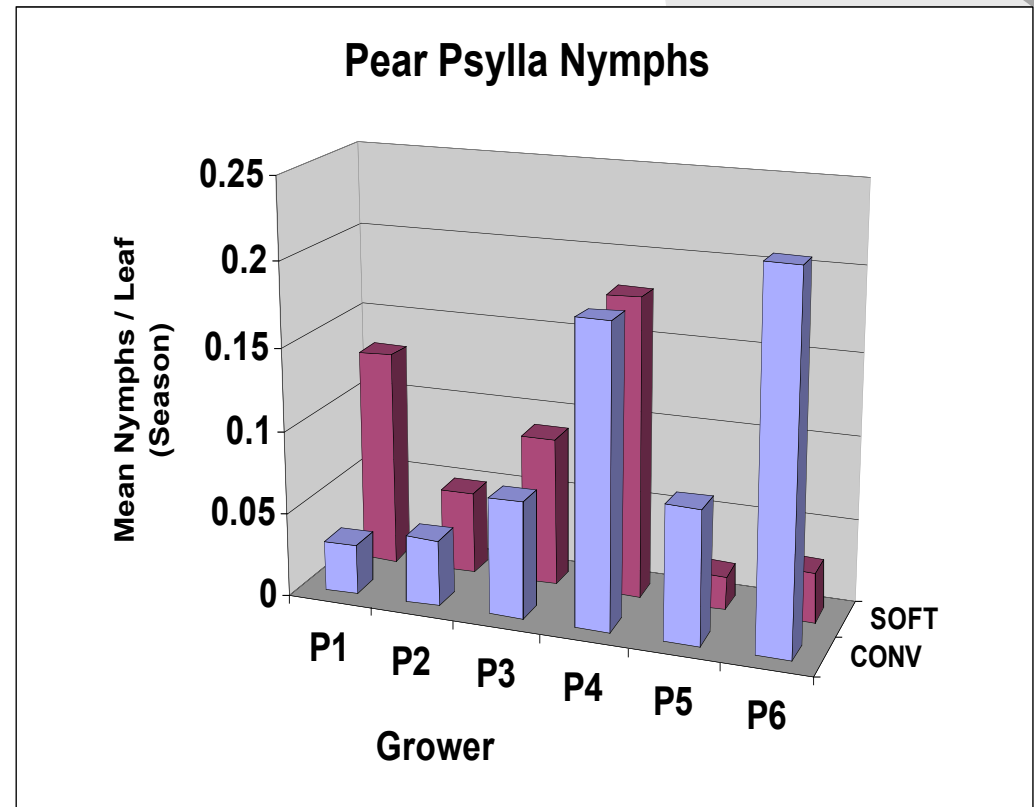
## Pear psylla adults

- Generally the same
  - Conv. slightly higher in 2 (not signif.)



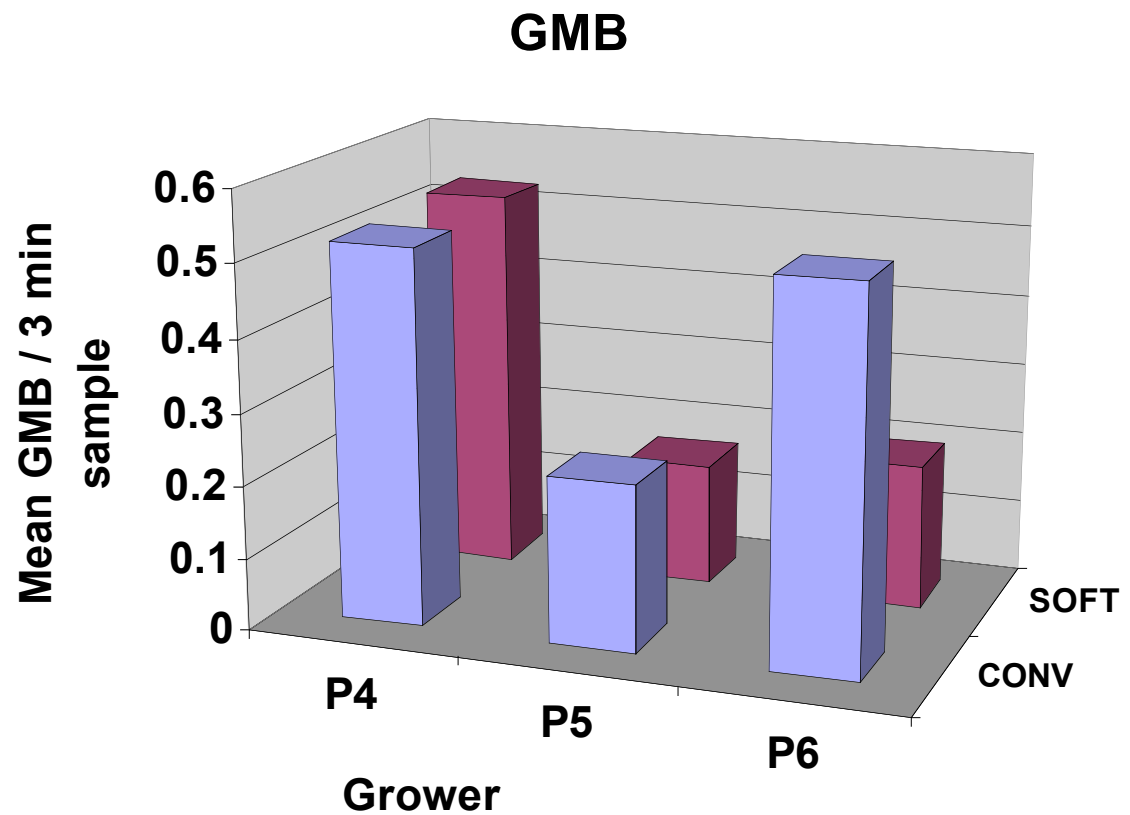
## Pear psylla nymphs

- Low psylla nymphs in both
- Good control of damaging stage



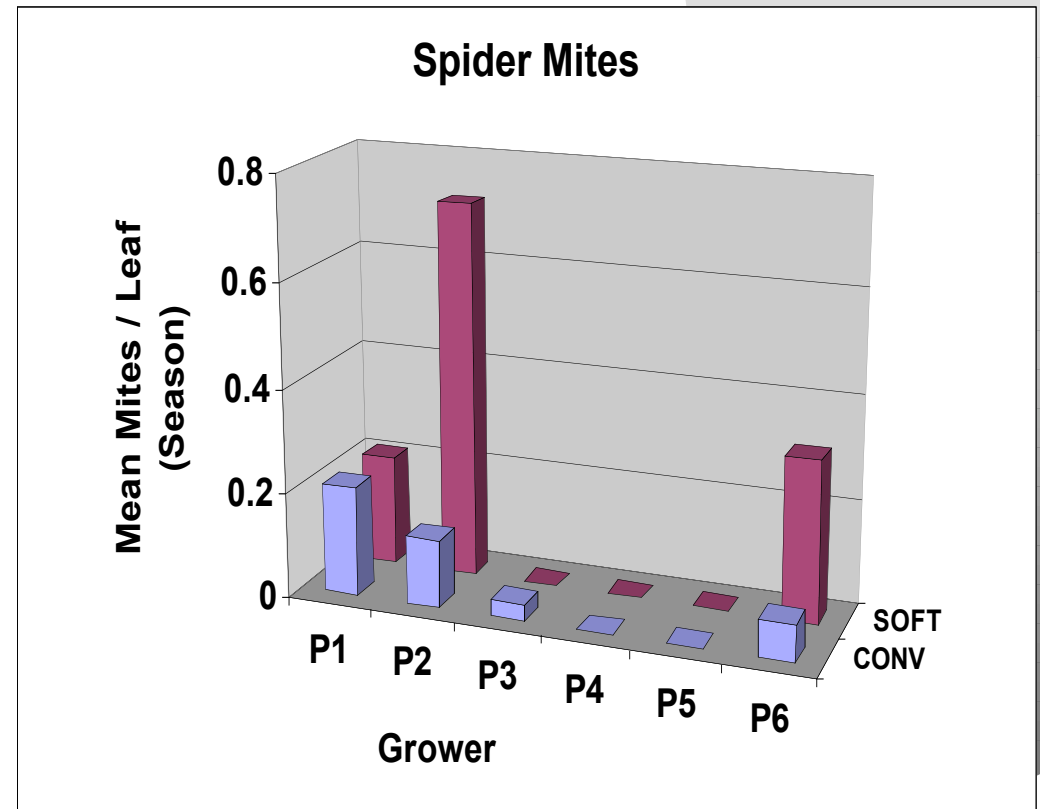
## Grape mealybug

- Only in Wenatchee
- Densities the same



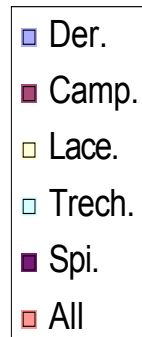
## Spider mites

- Spider mites generally the same
- Same control tactic used in each
  - Acramite



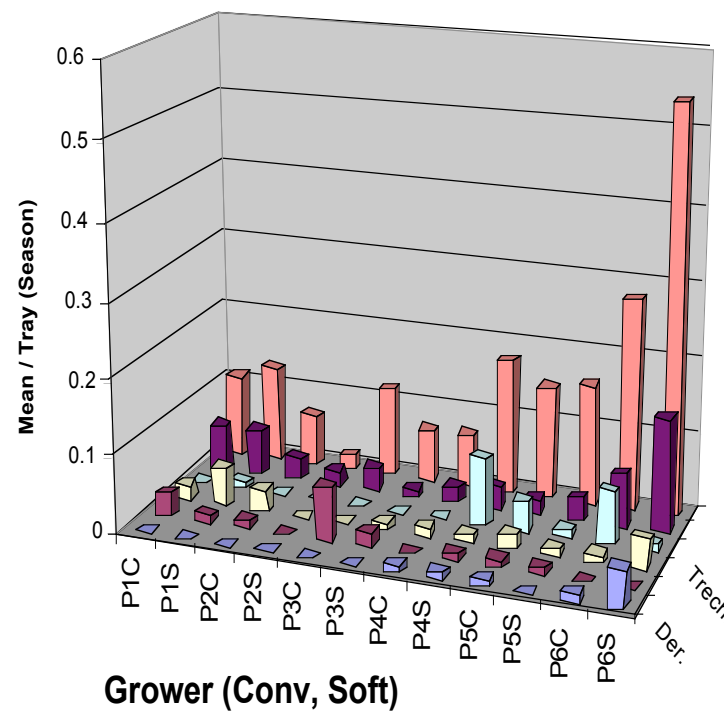
# Biocontrol

- No consistent trend
- No 'burst' of biocontrol in soft



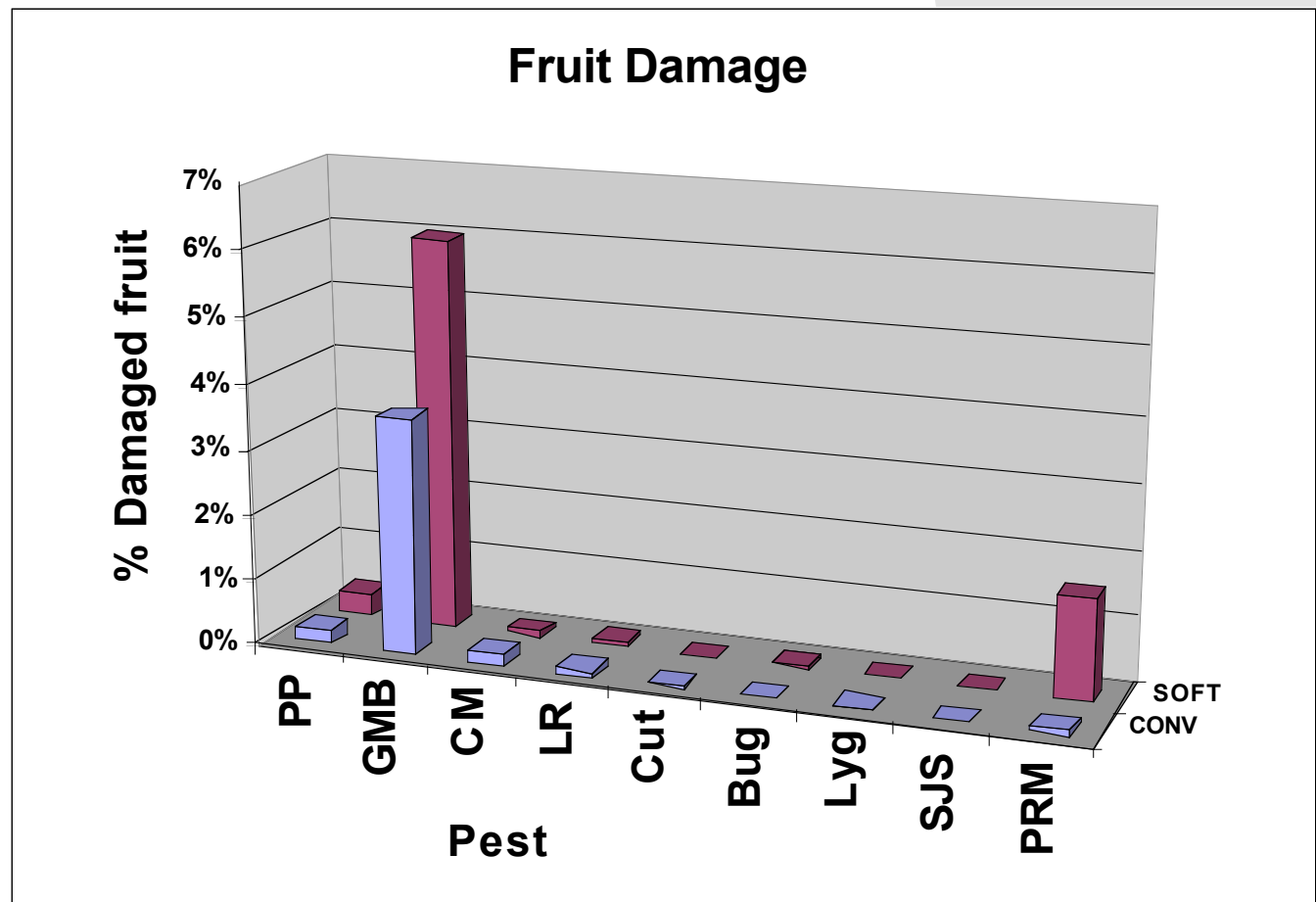
Der. – 1 Soft higher  
 Camp. – Conv. slightly higher  
 Lacewing – no pattern  
 Trech. – expect Soft higher, more  
           Conv. higher  
 Spider – Soft slightly higher  
 Overall – no clear pattern

Natural Enemies



## Mean fruit damage by pest at harvest

- Differences in
  - GMB
  - PRM
- No good IGR controls



## Summary: All-IGRs All-the-Time

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- IGR program generally worked
  - Very soft alternative to organic
- Rust mites, GMB problems
  - Predicted it before season
  - Buprofezin (Applaud) will handle GMB
  - Rust mites???
- More info should come from year 2



# Areawide Organic Pear Pest Management

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Peshastin Creek  
Growers Project

## Background

- **Areawide Organic - Organic-ish**
  - **Areawide organic insect pest management**
  - **The furthest stretch for IPM**
    - Arbitrarily limited to a few selective options
  - **Transition between programs easy**
    - Step down rather than step up
    - Transitional to Organic
    - Transitional to Super-soft

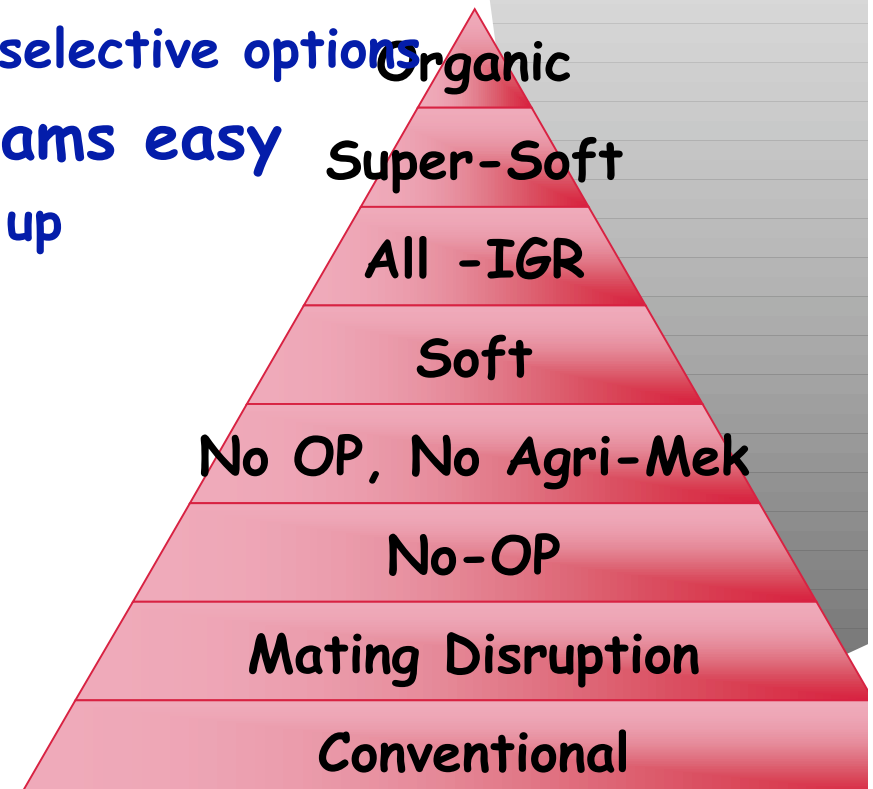
### Terms

Organic = Certified Organic

Organic-ish = organic IPM, not certified

Super-soft = organic IPM + IGRs

Soft = Super-soft, IGRs



## Areawide Organic in pear

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- Pest biology makes sense for areawide
  - Codling moth mating disruption
    - Areawide has been highly successful
  - Pear psylla
    - Previous areawide efforts
      - OPs in the early '80s
      - Pyrethroids in the mid '80s
      - Surround - current
    - Dispersal of psylla
      - Evens out the regional density

# Psylla control

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- Surround
  - Areawide use has dramatically decreased pear psylla
  - 'psylla equivalent of mating disruption for codling moth'
    - Opens up opportunities
- Azadirachtin
  - Aza-Direct
  - Neemix
  - Ecozin
  - All work well
    - Soft
    - Frequent applications

## Areawide Organic in pear

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- **Biological control**
  - Generalist natural enemies
  - Move from surrounding habitat
  - Disrupted by broad-spectrum insecticides
- **Areawide = creating opportunities**
  - Increase the size of borders for immigration of biocontrol
  - Create "corridors" to interior
    - Organic surrounded by conventional has little chance of biocontrol

## Areawide Organic Insect Pest Management Program

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- **12 growers**
  - 10 families
- **310 acres**
  - Plus conventional
- **Three comparisons**
  - 180 ac certified Organic
    - Includes 60 ac certified in Sept.
  - 130 ac Super-soft
  - 22 ac conventional

# Insecticide Programs

## Conventional

## Soft (mating disruption)

## Organic (mating disruption)

### Delayed/Dormant

- 1) Thiodan
- 2) Surround
- 3) Lorsban
- 4) Oil

- 1) Thiodan
- 2) Surround
- 3) Oil
- 4) Sulfur

- 1) Surround
- 2) Oil
- 3) Sulfur

### Clusterbud

- 1) Sulfur
- 2) Oil
- 3) Surround
- 4) Esteem

- 1) Surround
- 2) Azadirachtin
- 3) Oil

- 1) Surround
- 2) Oil
- 3) Azadirachtin

### Petalfall

- 1) Actara
- 2) Oil

- 1) Azadirachtin
- 2) Oil

- 1) Oil
- 2) Bt

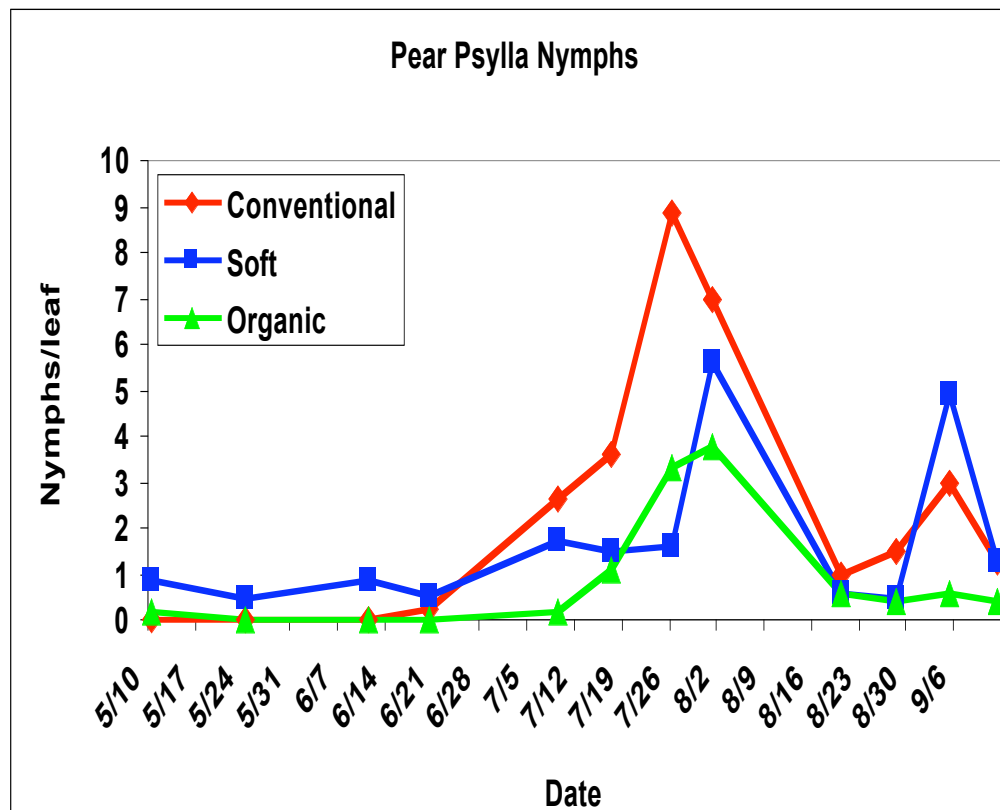
### Summer

- 1) Guthion
- 2) Vendex
- 3) Agri-Mek

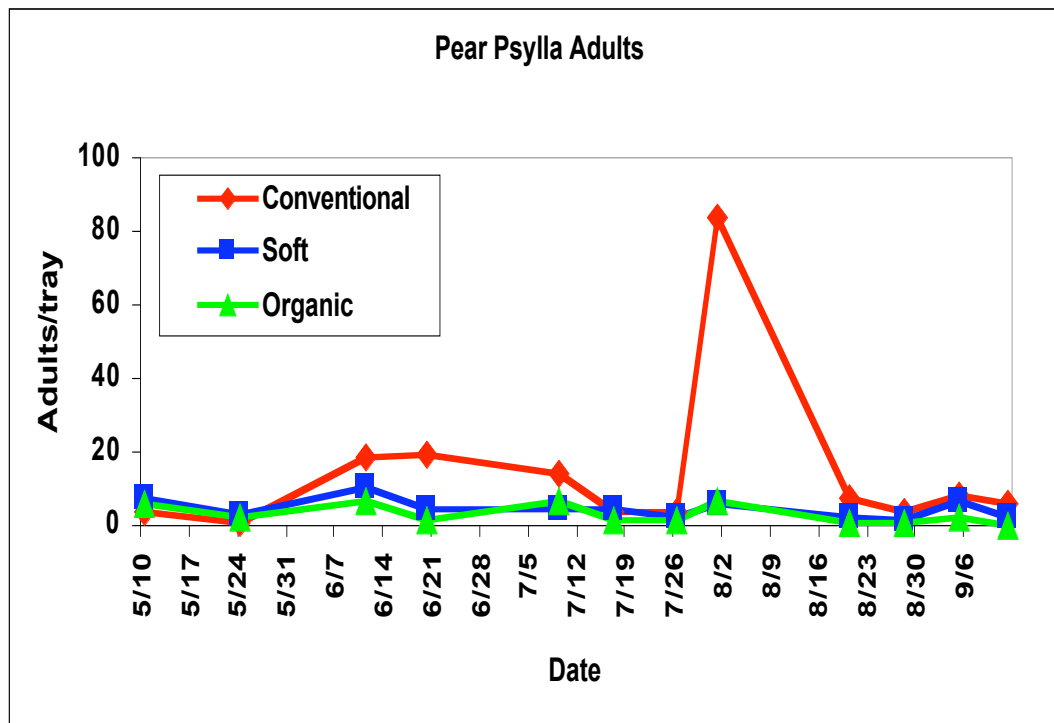
- 1) Oil
- 2) Acramite
- 3) Azadirachtin

- 1) Oil
- 2) Azadirachtin

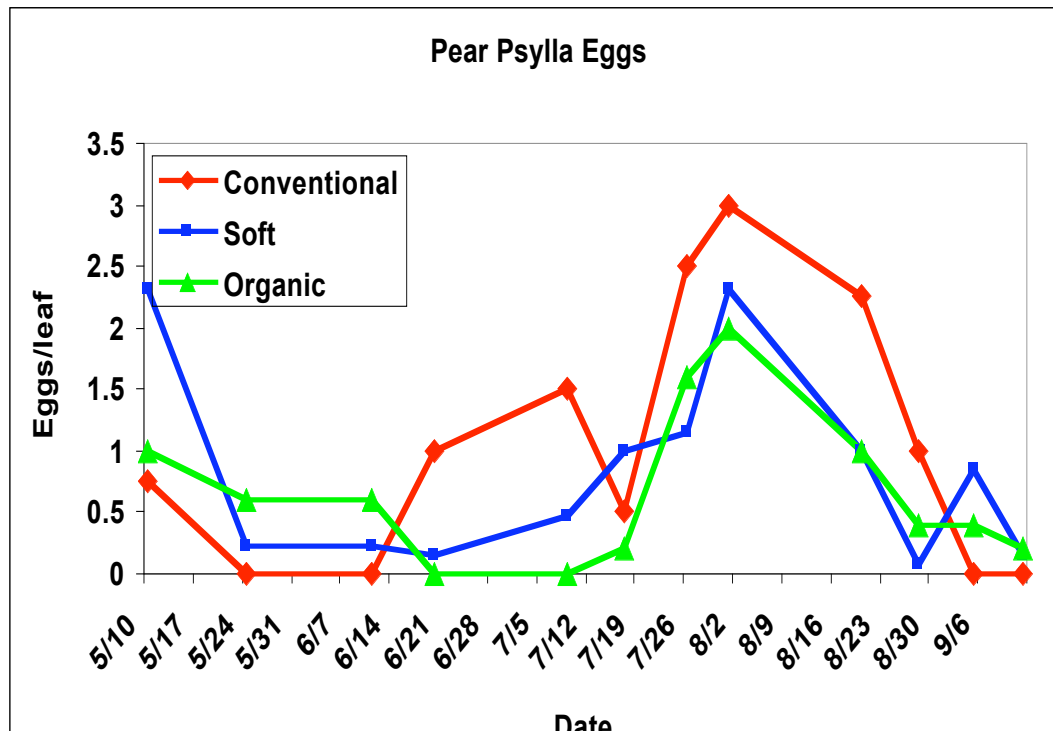
## Psylla nymphs



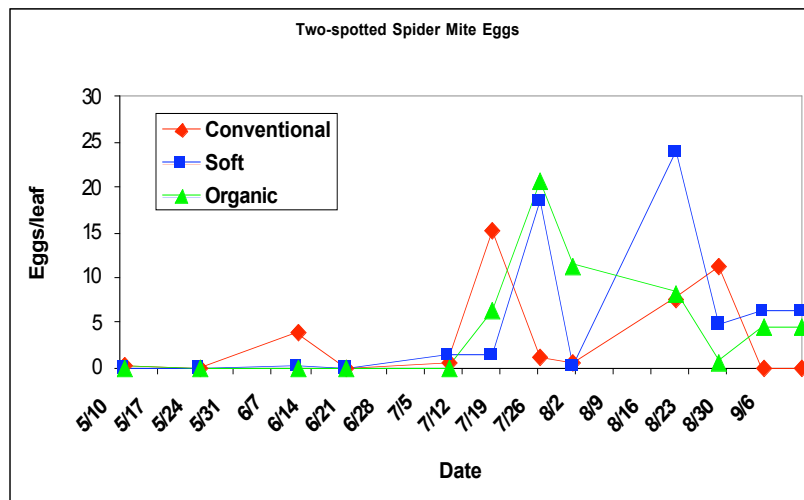
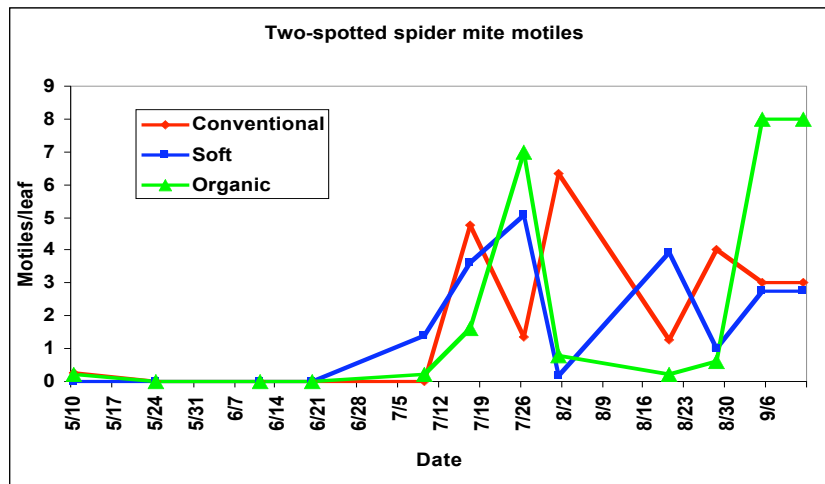
## Psylla adults



## Psylla eggs



# Spider mites



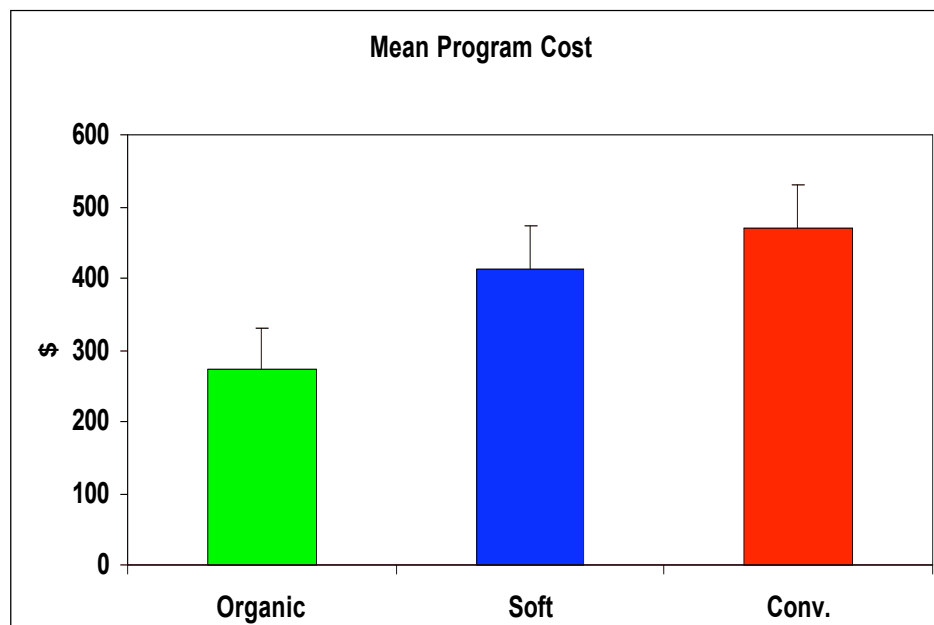
# Biological Control

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- Was there any biocontrol?
  - Psylla was controlled
  - Aza isn't THAT strong
  
- Numbers certainly weren't very high
  - Anthocorids
  - Campylomma
  - Deraeocoris
  
- Maybe next year?

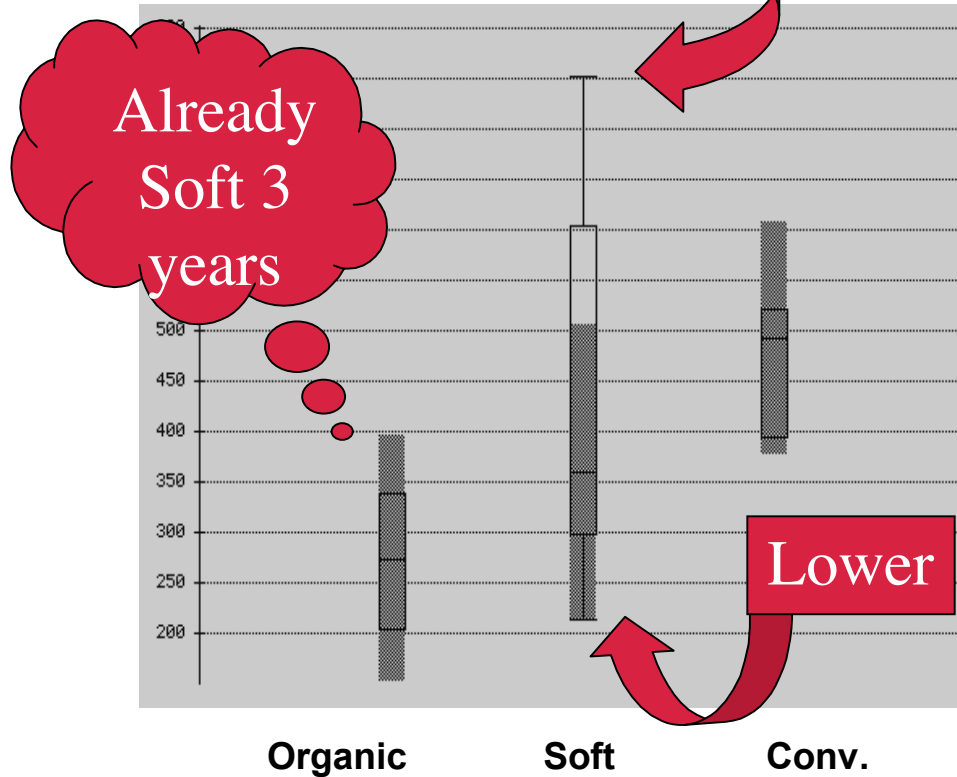
# Program costs

## Mean Costs

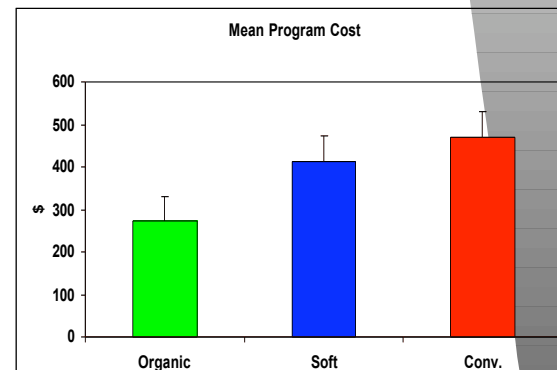


# Program costs

## Cost Distribution



## Mean Costs



## **HOWEVER, if considering organic .....**

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- **Insecticide costs are a small fraction of overall production costs**
  - **Other costs may increase**
- **Monitoring time increases**
  - **As does RISK**
- **More applications of materials**
  - **Increase time on sprayer**
- **Don't know yield effects yet**

## Pest problems

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- Pear sawfly
  - Shows up in supersoft and organic pear
  - Relatively easy to manage
- Lesser appleworm
  - Showing up in the upper Wenatchee Valley
  - Manage with Bt
  - More info needed on phenology
- Pear rust mite
  - Widespread
  - Nothing to help after petal fall
  - Deal-breaker
    - Soft programs may use Vendex next year

# Tree to Table IPM

- Developing markets
  - Blue Bird Inc.
  - The Food Alliance in new markets
  - Self-marketing
- 'Green Label' marketing
  - The Food Alliance
    - 8 growers joined
  - 'near organic' criteria
- Grow the program
  - 1 or 2 more sites next year
    - In the vicinity
    - Eventually the whole Wenatchee Valley?





## Conclusion

- Soft pest management works
  - All-IGRs
  - Organic
  - Organic-ish
- New opportunities
  - New insecticides
  - Increased biological control
  - Choices

