Developing Biologically Integrated Orchard Systems & Corresponding Market Certification Reward for Canning Peaches in the San Joaquin Valley

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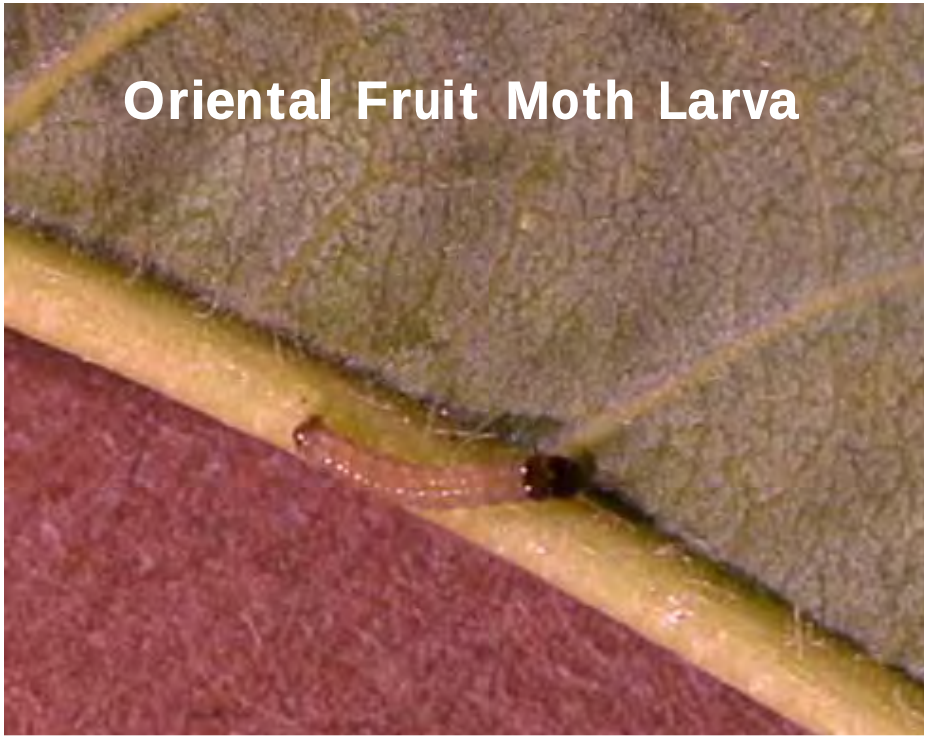
Seasonal Guide
to Environmentally Responsible
Pest Management Practices in
Peaches and Nectarines

Insects and Mites in Peaches

- Oriental fruit moth (OFM)
- Peach twig borer (PTB)
- Oblique-banded leafroller (OBLR)
- Omnivorous leafroller (OLR)
- San Jose Scale and its natural enemies
- Spider mites and their predators
- OFM parasitoid *Macrocentrus ancylivorus*
- General orchard predators

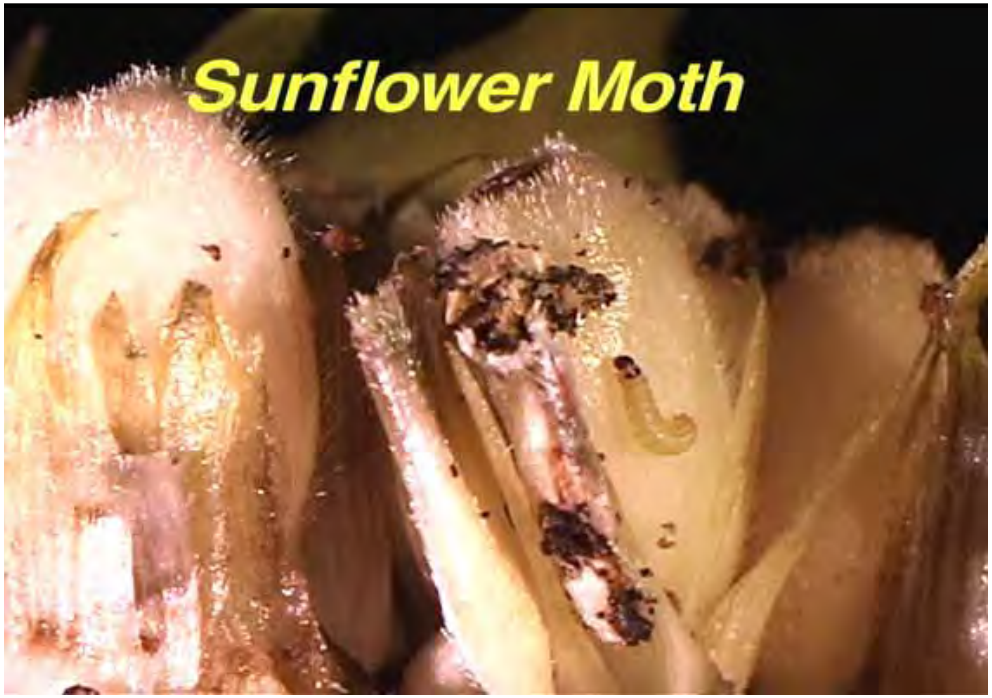
Hanging Isomate TT for Oriental Fruit Moth Mating Disruption

- By March 1 in northern San Joaquin Valley


Oriental Fruit Moth Larva

Walter Bentley

Macrocentrus ancylivorus adult


Sunflower Moth

Extend drip line at end of row

Extend drip line along road

Objectives

1. Reduce the perceived need and use of Food Quality Production Act Priority I materials (phosphates and carbamates) by 20% in California canning peaches through demonstration and outreach to increase adoption of reduced risk practices and materials for key pests

2. Increase and hasten grower transition to more IPM methods through applied on-farm research on pest population dynamics and conservation of key beneficial species

3. Evaluate costs to growers of adopting reduced-risk production practices and grower perception of adopting environmentally-responsible product certification

Tasks to Accomplish Objective 1

- Continually monitor, support, and re-establish plots
- Hold informal training sessions on scouting and reduced-risk practices on demonstration farms
- Provide information through presentations and handouts at 2 grower meetings
- Show growers how to identify damage caused by insects
- Host three field days in Merced and Fresno
- Develop a website on canning peach IPM
- Final interview of participating growers about perceptions of reduced-risk practices, associated material and labor costs, and harvest parameters

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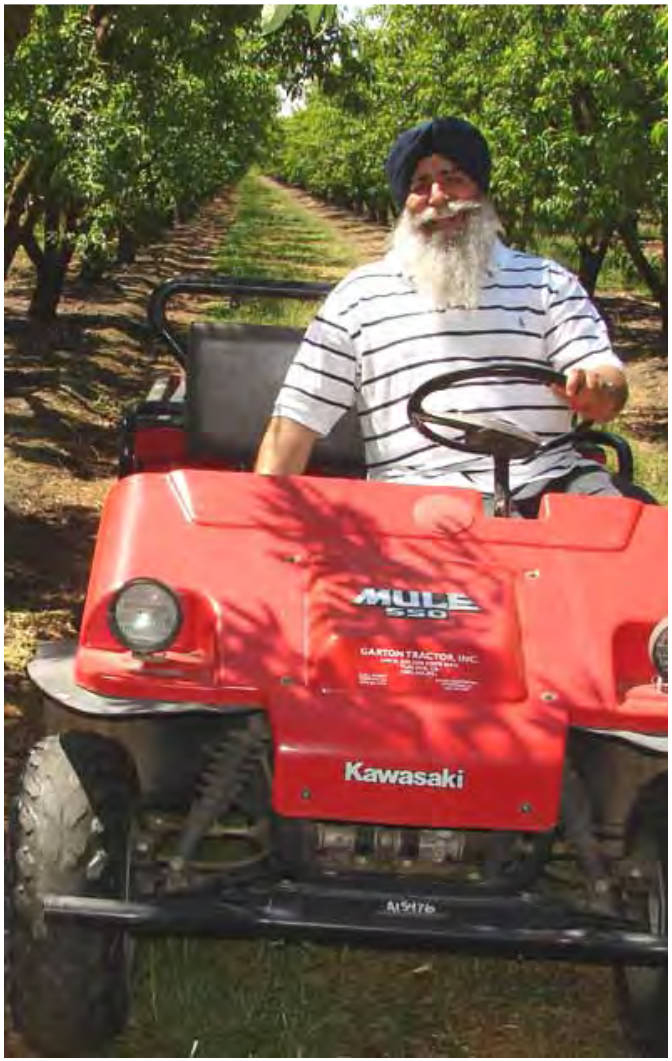
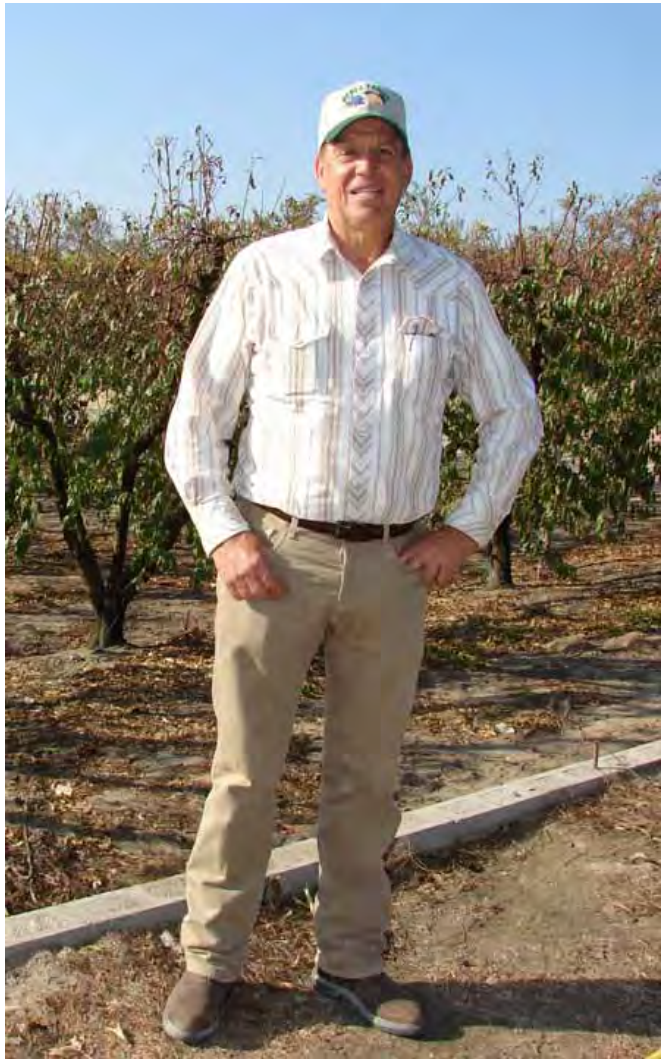
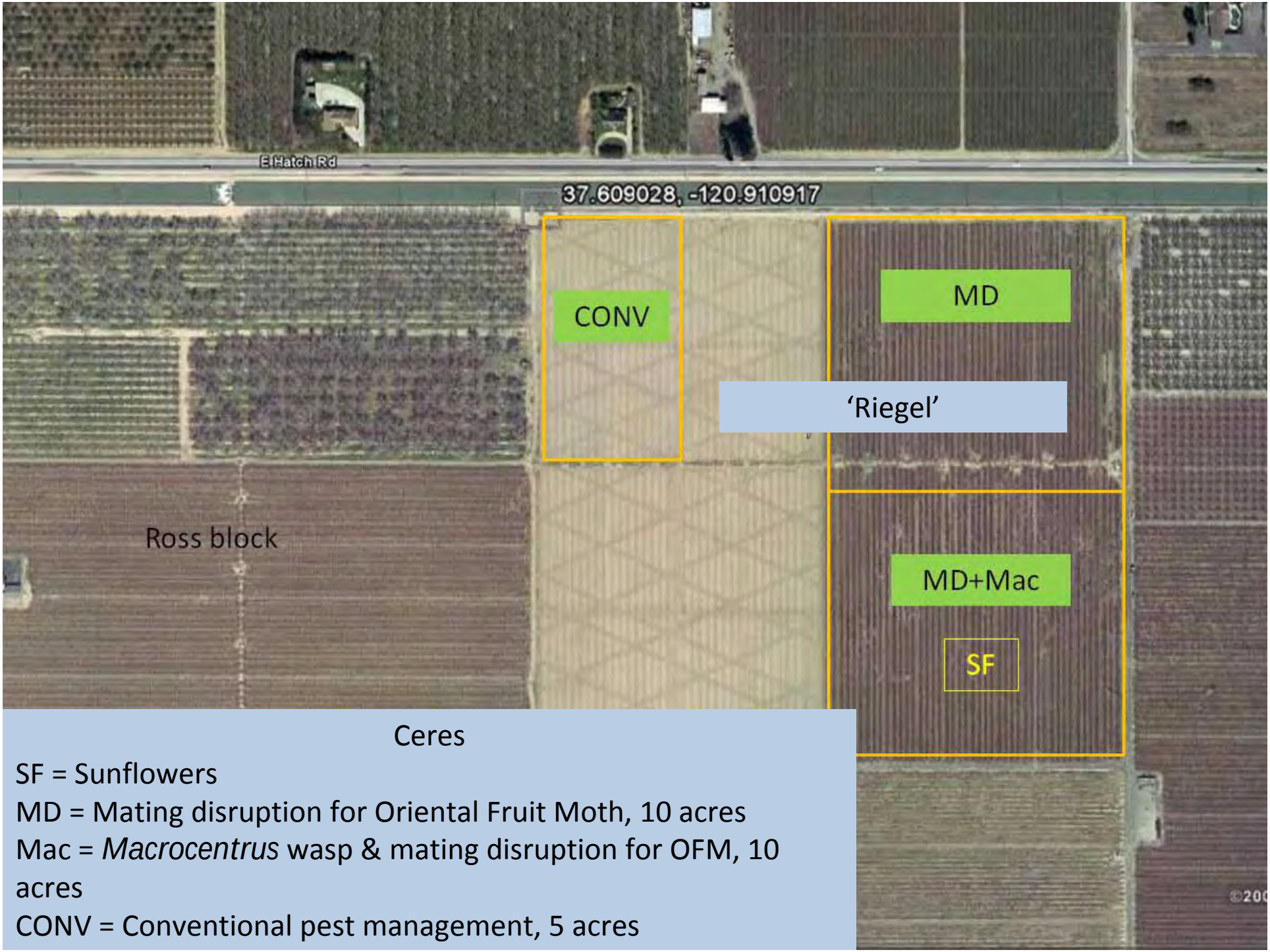
We found several willing growers







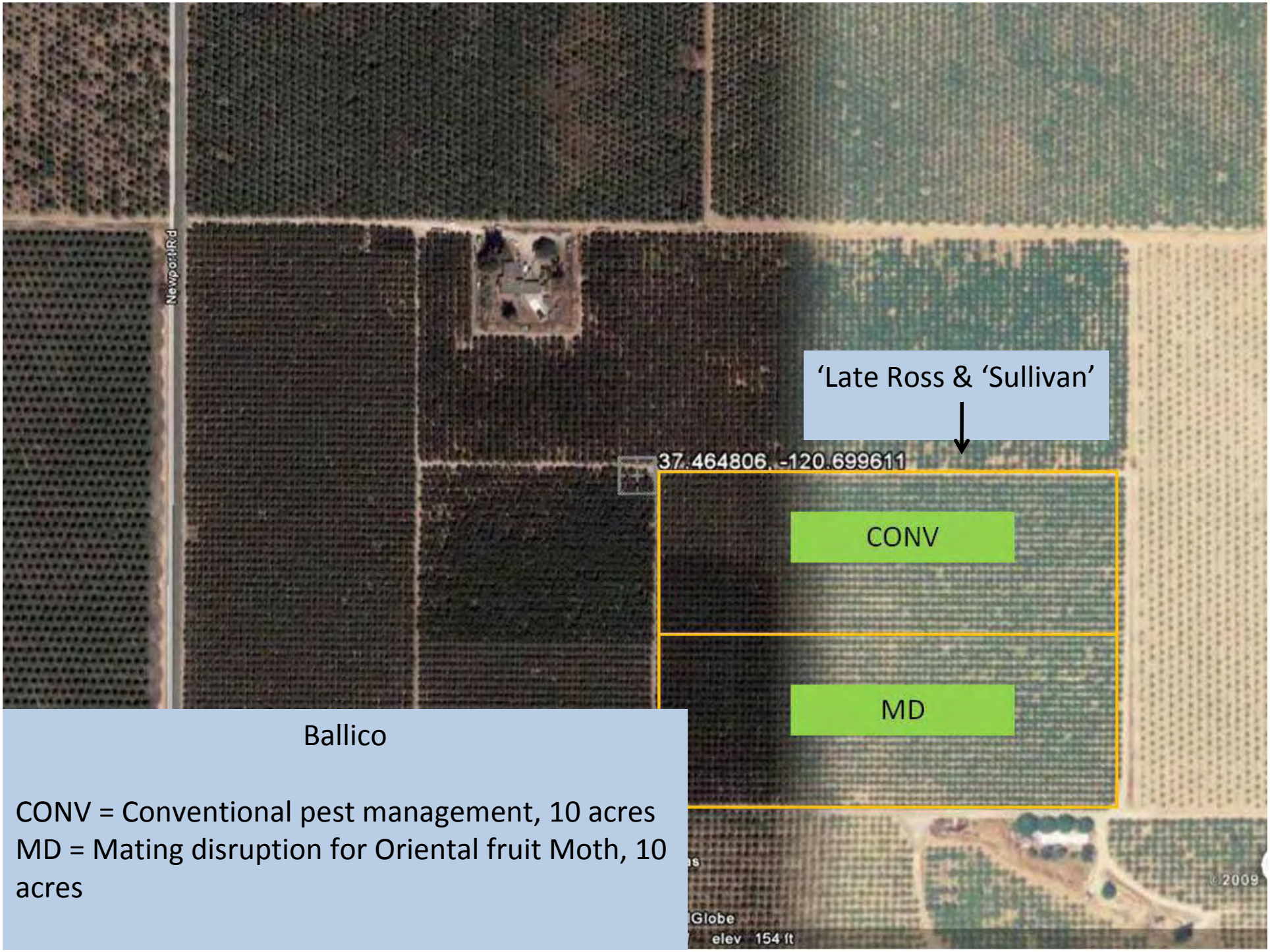
Ceres

SF = Sunflowers

MD = Mating disruption for Oriental Fruit Moth, 10 acres

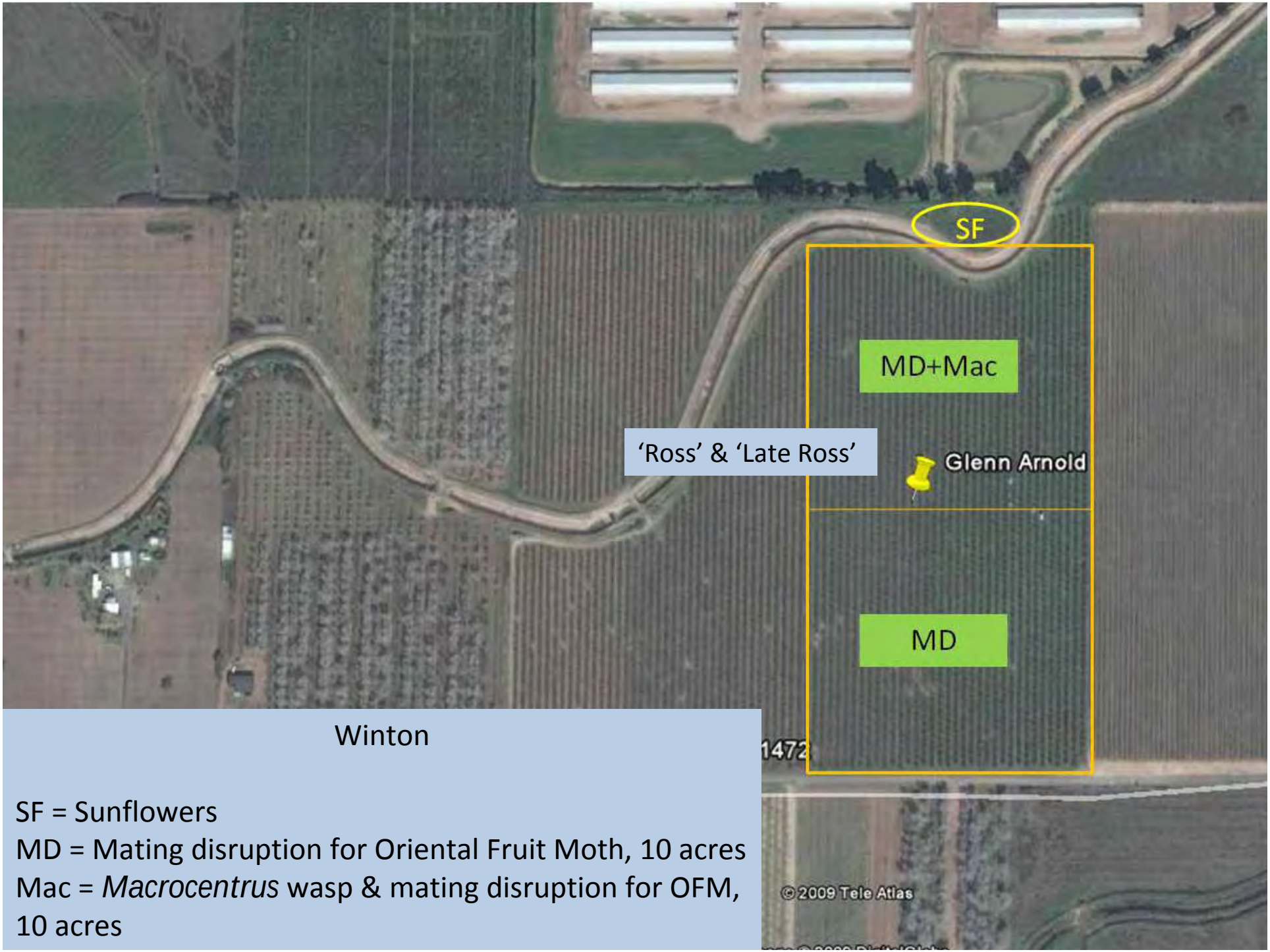
Mac = *Macrocentrus* wasp & mating disruption for OFM, 10 acres

CONV = Conventional pest management, 5 acres



Ballico

CONV = Conventional pest management, 10 acres
MD = Mating disruption for Oriental fruit Moth, 10 acres



Winton

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Outreach efforts at Field Days

Hannah Nadel

Walt Bentley

Walt & Hannah

Maxwell Norton

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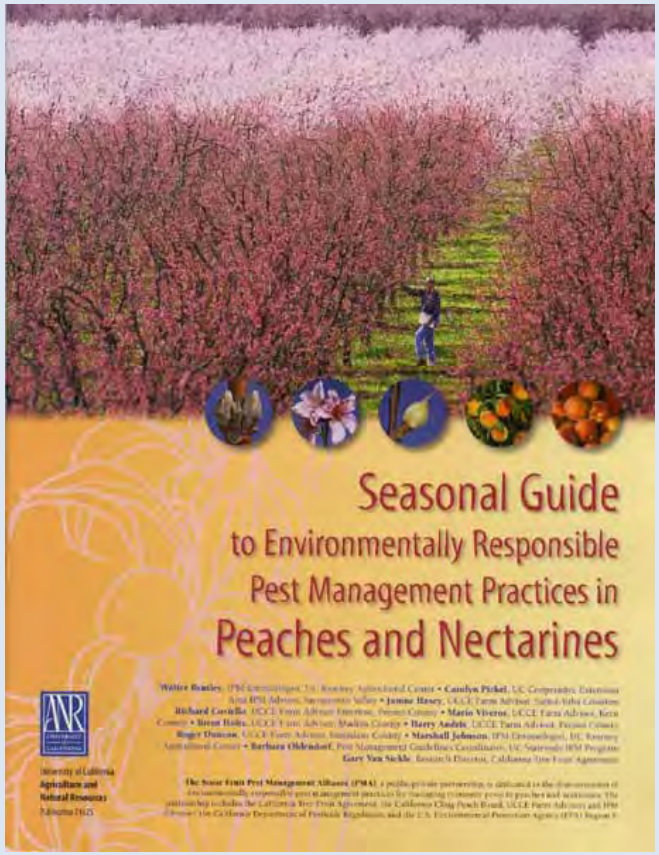
Treatment Plan

- Mating Disruption Plots:
  - UC's Seasonal Guide to Environmentally Responsible Pest management Practices in Peaches and Nectarines (monitor, treat with soft pesticides if needed, etc.)
  - Isomate TT mating disruption product for Oriental Fruit Moth (6 months efficacy)



- Conventional Plots:
  - As before (broad spectrum pesticides, etc.)

Sunflowers and *Macrocentrus*

- Summer (May 2009) sunflower planting
  - Four releases of *Macrocentrus* in orchards
  - Sunflower moth infested all plots of sunflower
    - *Macrocentrus* emerged in all plots
- Fall (September 2009) sunflower planting
  - Ongoing

Tasks to Accomplish Objective 2

- Monitor populations of spider mites, San Jose scale, and other potential pests throughout 2009 and 2010
- Plant sunflowers in early April, June, and July 2010 in 3 orchards
- Monitor previously released *Macrocentrus ancylivorous* parasitism in sunflower moth and OFM from June 2010 to January 2011
- Hang OFM pheromone dispensers in March 2010 in blocks and monitor adult OFM populations with bait buckets during each generation
- Evaluate fruit damage by each pest in study blocks of participating IPM and conventional orchards

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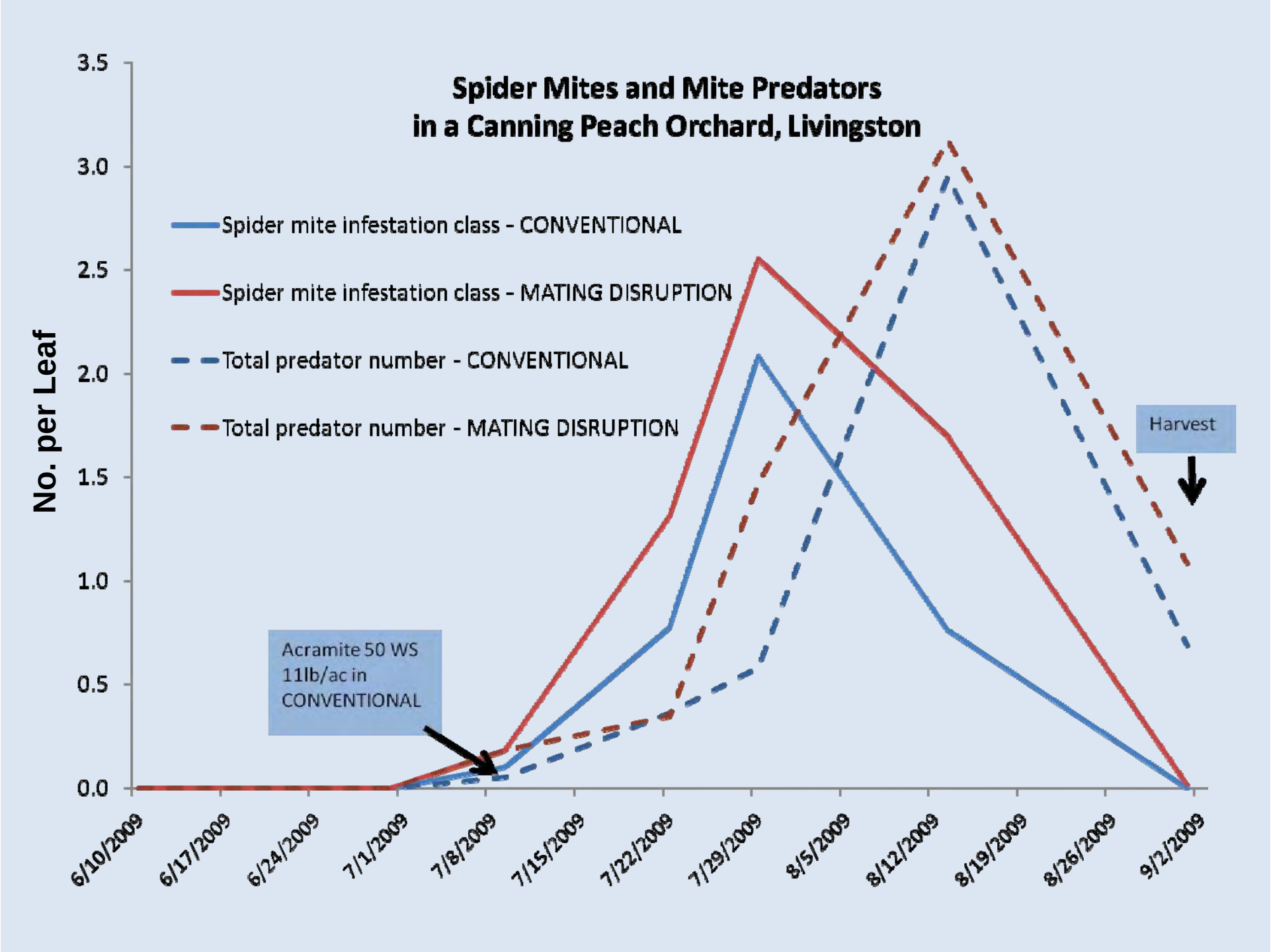
Webspinning spider mites

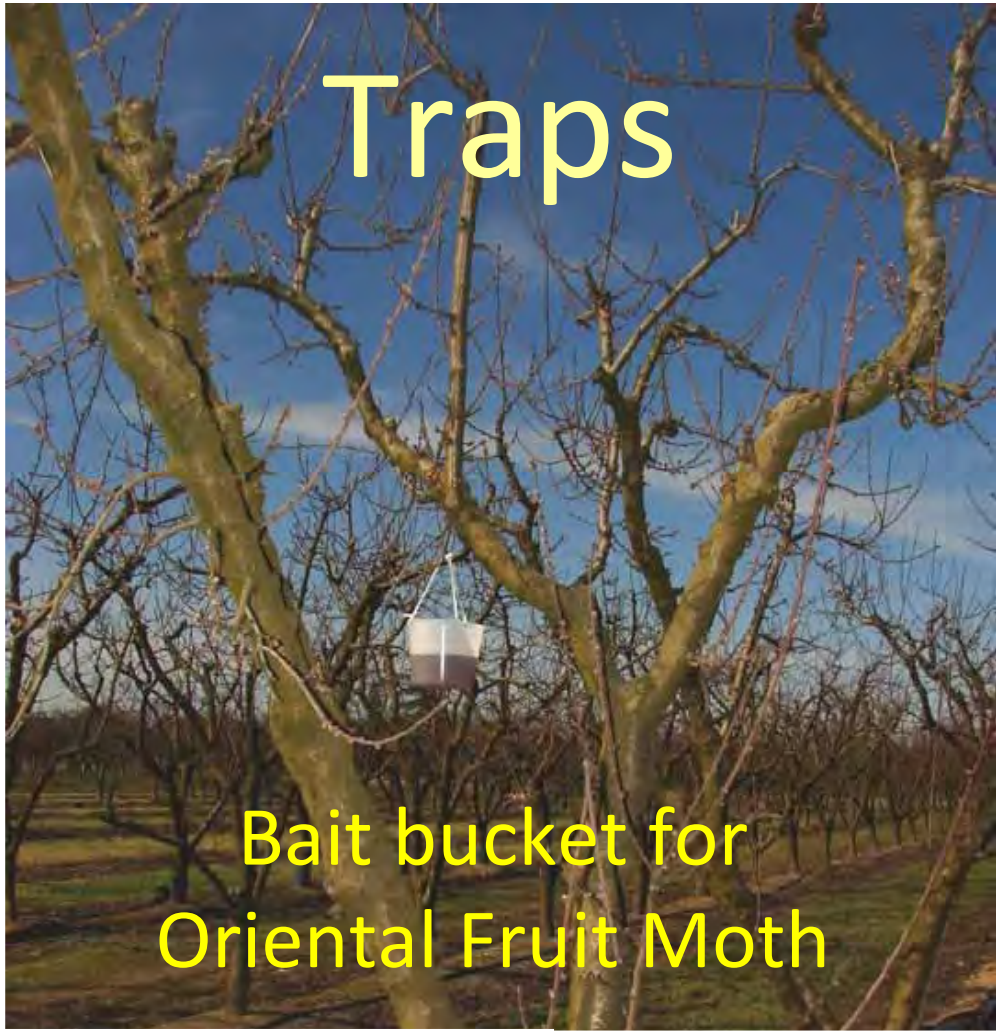
Predators

- Western predatory mite
- Six-spotted thrips
- Spider-mite destroyer
- Lacewing larvae


Spider Mites and Mite Predators
in a Canning Peach Orchard, Livingston
No. per Leaf
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Spider mite infestation class - CONVENTIONAL
Spider mite infestation class - MATING DISRUPTION
Total predator number - CONVENTIONAL
Total predator number - MATING DISRUPTION
Acramite 50 WS
11lb/ac in
CONVENTIONAL
Harvest
6/10/2009
6/17/2009
6/24/2009
7/1/2009
7/8/2009
7/15/2009
7/22/2009
7/29/2009
8/5/2009
8/12/2009
8/19/2009
8/26/2009
9/2/2009

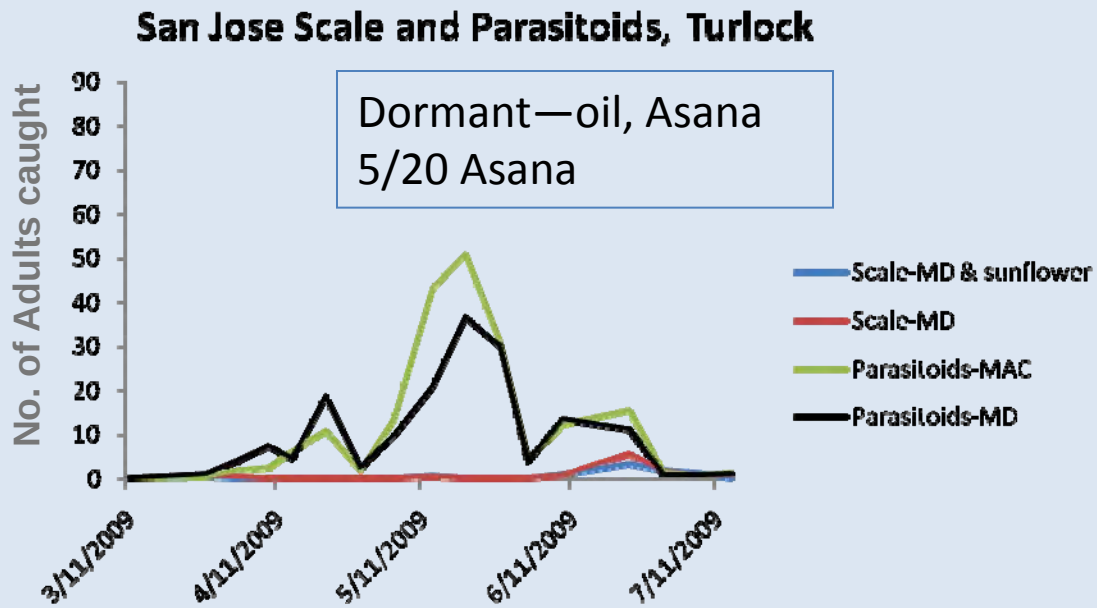
Traps

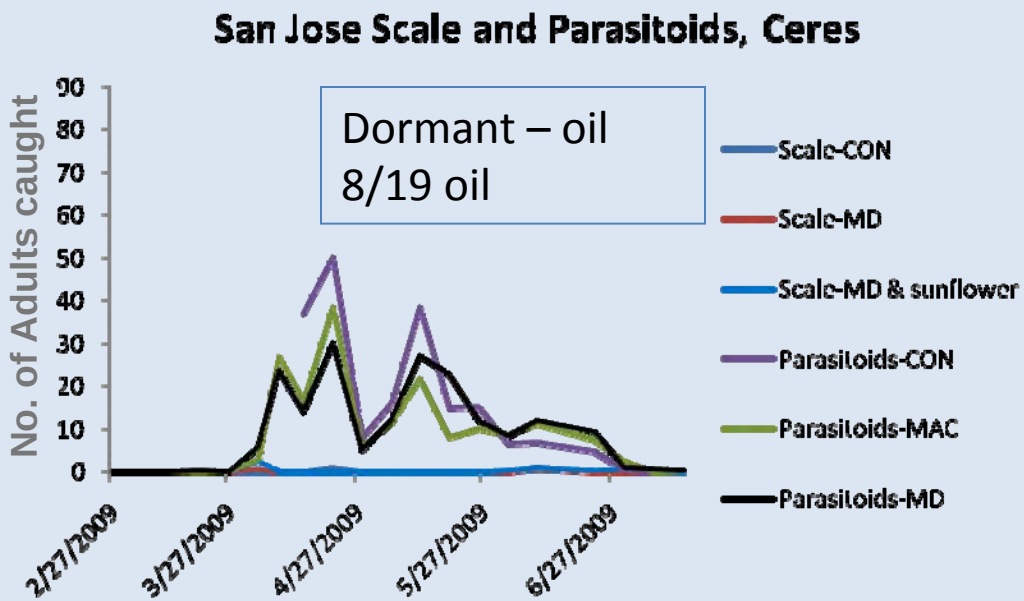
San Jose Scale

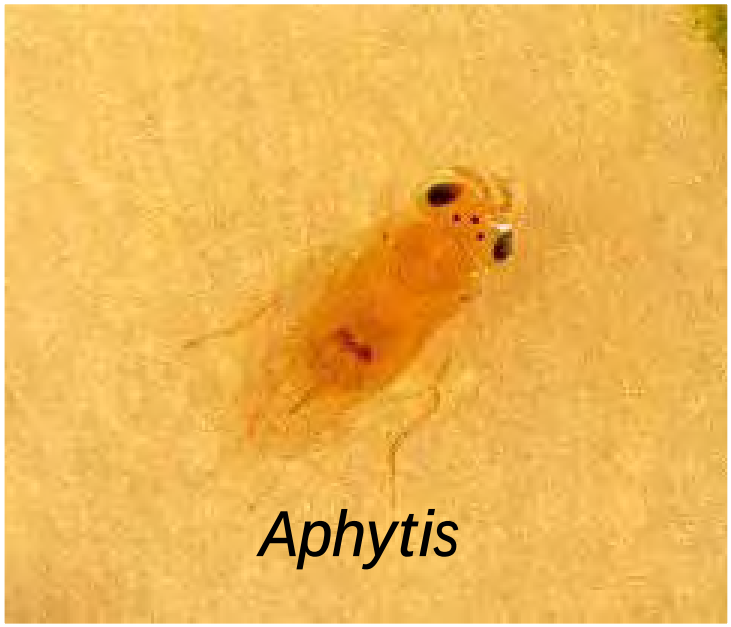

Bait bucket for
Oriental Fruit Moth

Delta pheromone trap for
4 moth species

San Jose Scale & Natural Enemies

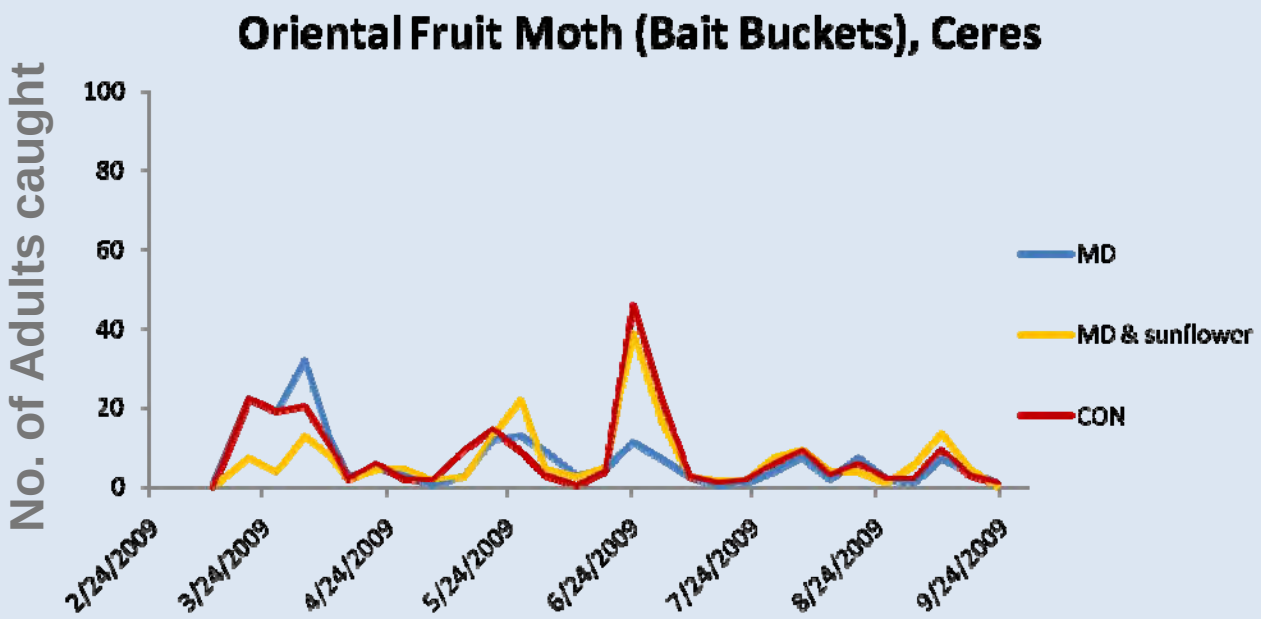






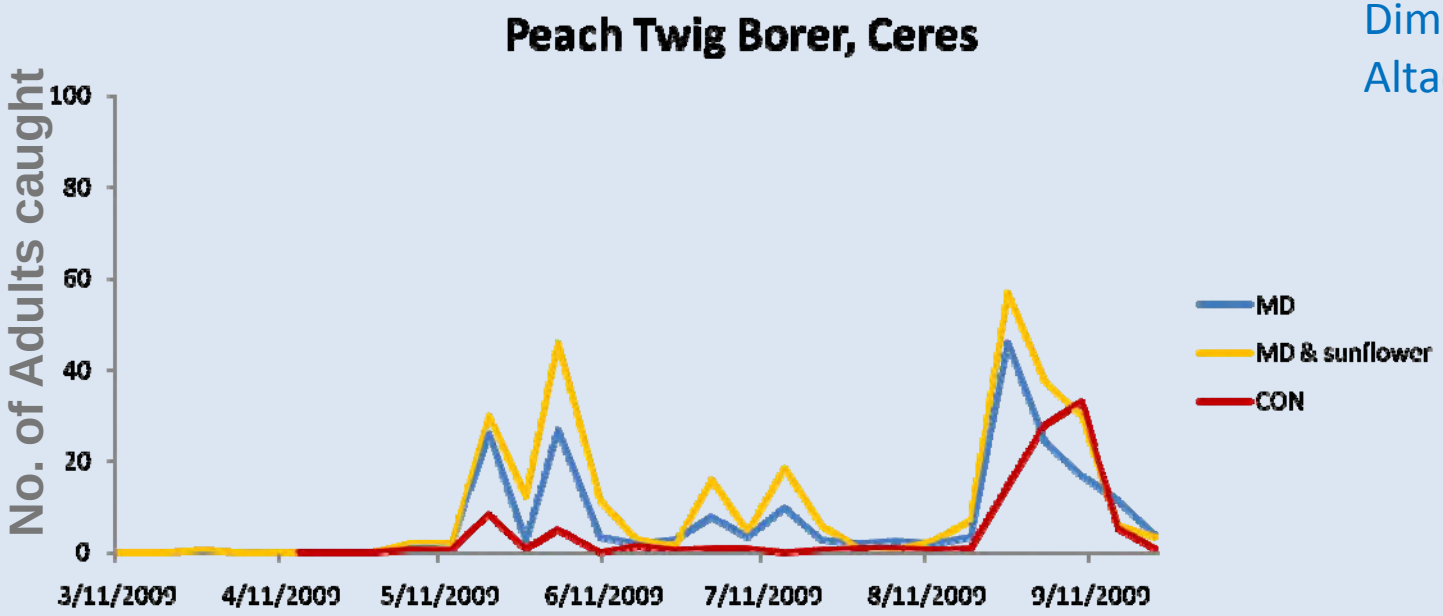
No fruit damage due to scale

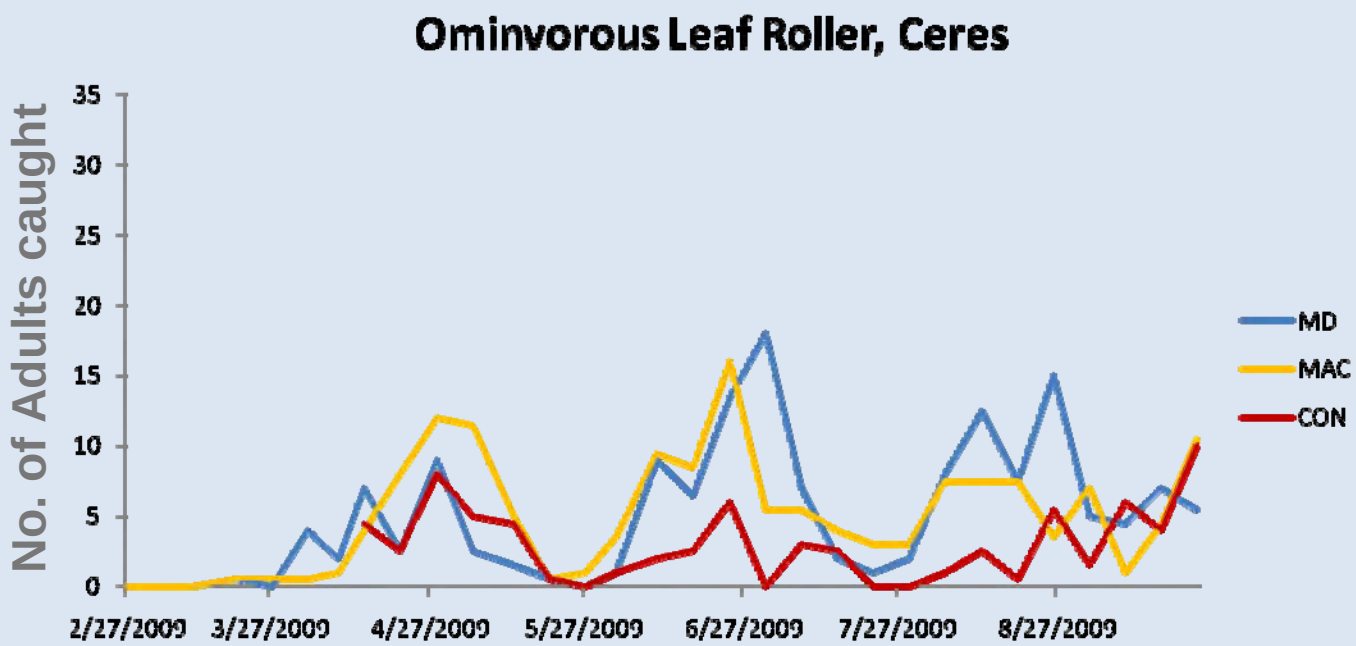
PHEROMONE TRAPS



Conventional
Dimilin 2/26, 3/3
Intrepid 4/13
Silencer 5/23
Altacor 7/1

Mating Disruption
Isomate 2/27
Dimilin 2/28, 3/3
Altacor 7/1





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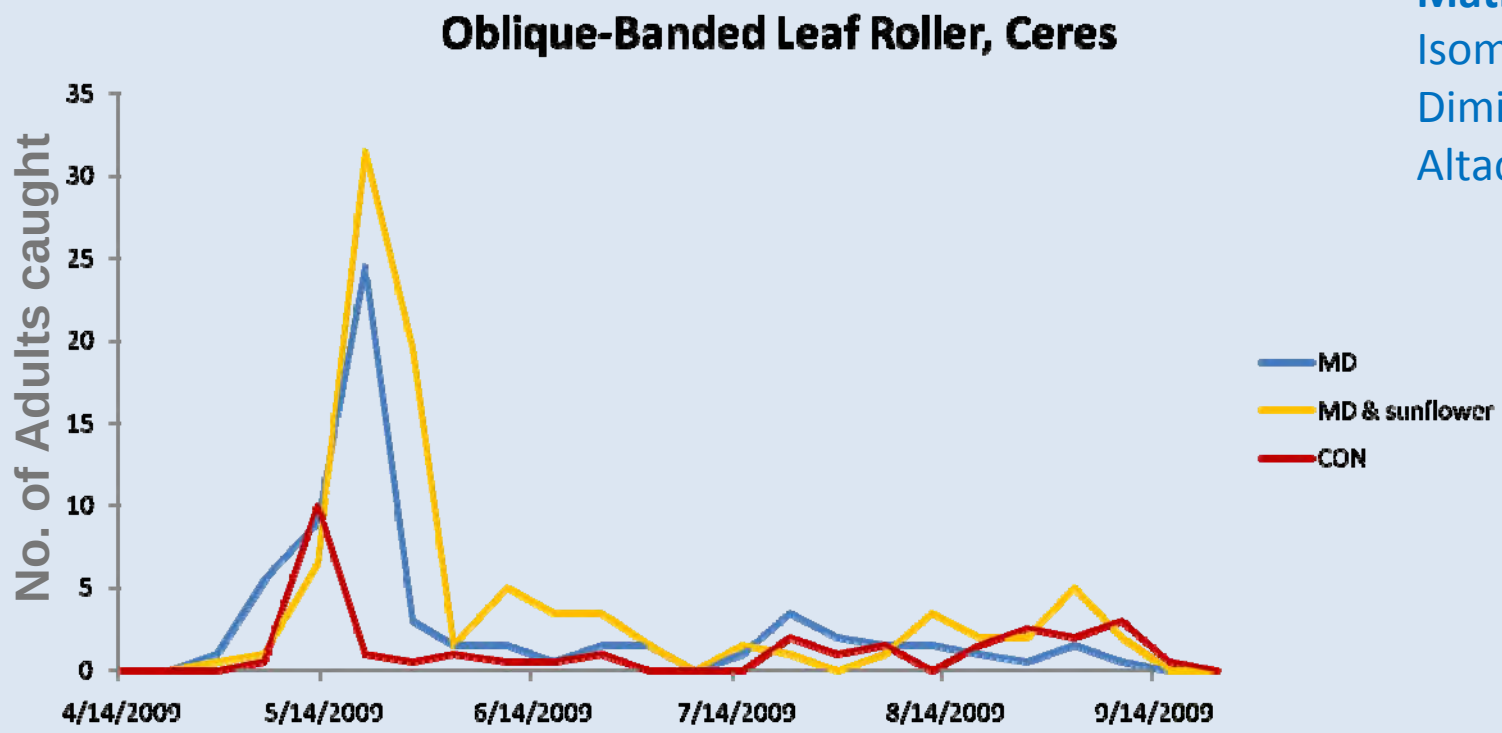
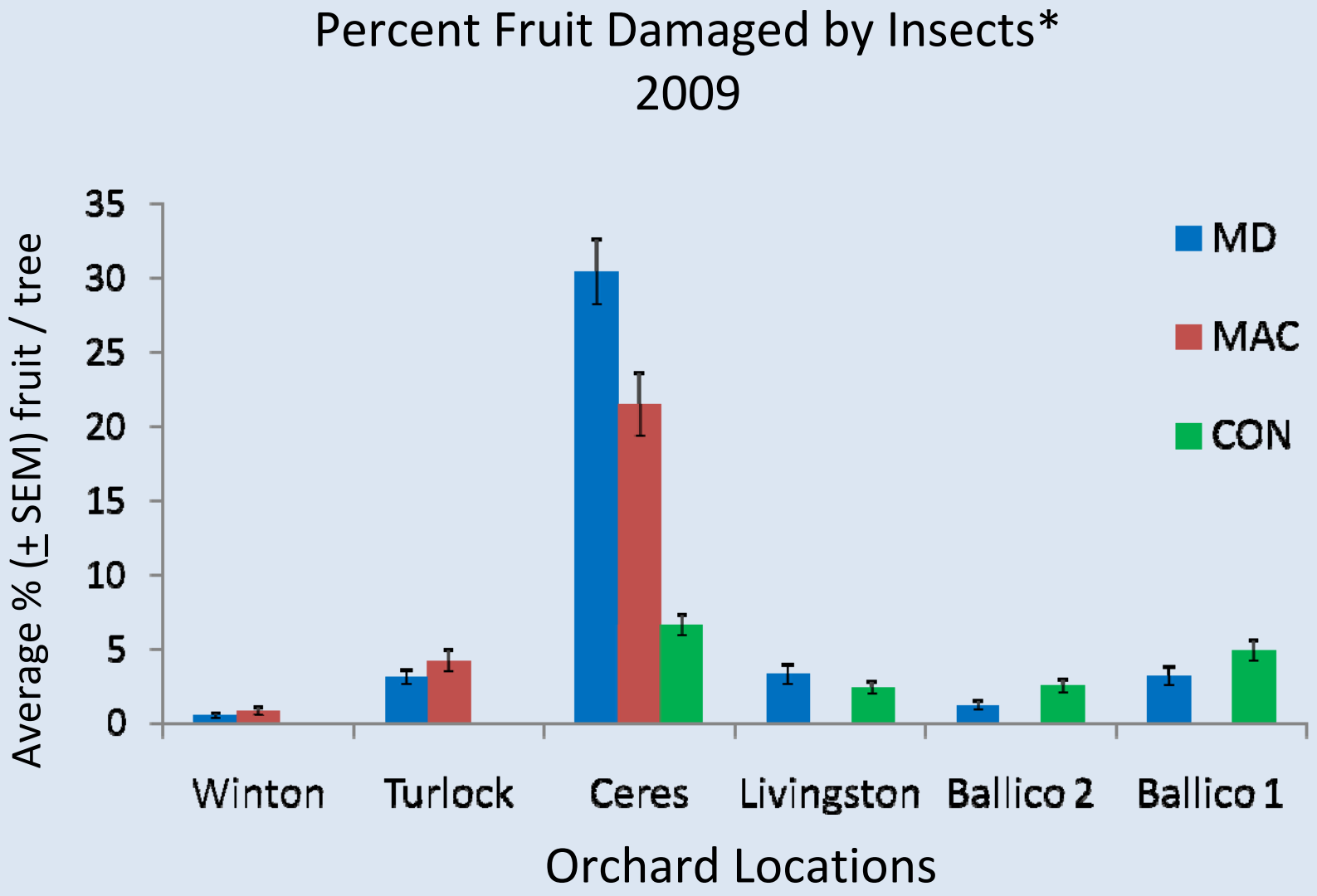


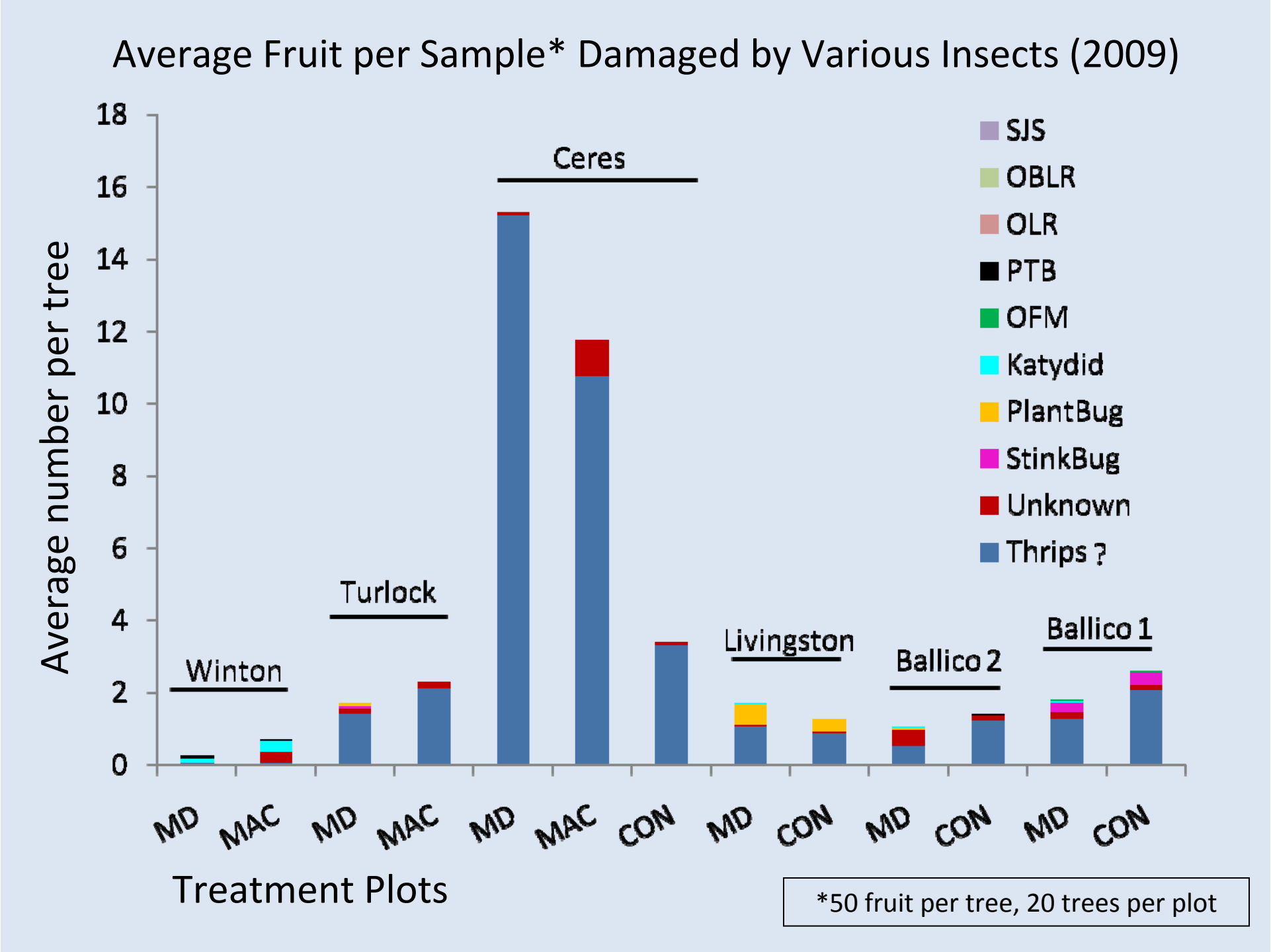
Natural Enemies of Pests in Peach Orchards

- Timed observations
  - Green lacewings
  - Ladybugs
  - Hover flies
  - Assassin bugs
  - Parasitic flies (tachinid flies)
  - Parasitic wasps
  - California gray ant

- No detectable differences in first year between Conventional & Mating Disruption or between Mating Disruption with & without sunflowers

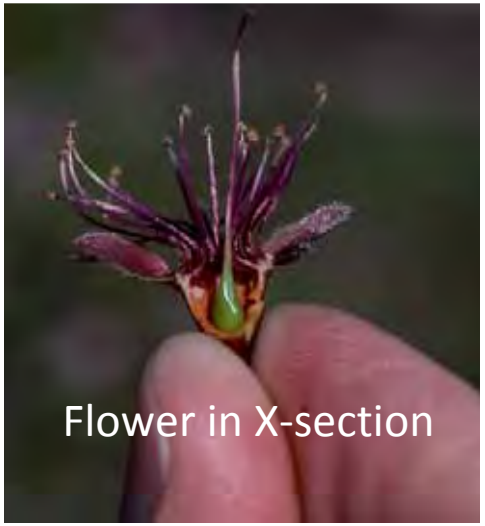


50 fruit per tree examined on 20 trees per plot, 1-3 weeks before harvest
* Unidentified damage excluded


Average Fruit per Sample* Damaged by Various Insects (2009)
Average number per tree
18
16
14
12
10
8
6
4
2
0
Winton
Turlock
Ceres
Livingston
Ballico 2
Ballico 1
MD
MAC
MD
MAC
MD
MAC
CON
MD
CON
MD
CON
MD
CON
Treatment Plots
SJS
OBLR
OLR
PTB
OFM
Katydid
PlantBug
StinkBug
Unknown
Thrips ?
*50 fruit per tree, 20 trees per plot

Fruit Damage

- Little or no detectable damage from Oriental Fruit Moth, Peach Twig Borer, Omnivorous Leafroller, or San Jose Scale in any orchard
- Most damage might be due to thrips, but this needs to be confirmed in 2010. Is some of the damage due to Oblique-Banded Leafroller?


Flower in X-section

Thrips damage identified by Jack Dibble

Damage in Ceres

Oblique-banded leaf roller

Ceres: Oblique-banded leaf roller?

Thrips or OBLR Damage?

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Tasks to Accomplish Objective 3

- Data collection from demonstration farms by 2009. Make comparisons of IPM practices with conventional management with respect to costs and returns
- Data analysis for 2009 and 2010 by November 2010
- Outreach on product certification by Food Alliance at grower meetings during spring and summer 2010
- Grower perception survey of product certification complete by October 2010 and report by January 2011
- Economic report completion by December 2010

Tasks to Accomplish Objective 3

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- Data analysis for 2009 and 2010 by November 2010
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Thanks to the Collaborating Growers, PCAs, and Farm Advisors

- Don de Boer
- John Johnston
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- Maxwell Norton
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- Glenn Arnold
- Darrell DiGiovanni
- Harvinder Kullar
- Sid Long & Scot Long
- José Perez
- Blaine Yagi & Ben Yagi

Macrocentrus ancylivorus