Developing Biologically Integrated Orchard Systems & Corresponding Market Certification Reward for Canning Peaches in the San Joaquin Valley (A Canning Peach Pest Management Alliance)

Marshall W. Johnson and Hannah Nadel

Department of Entomology, University of California, Riverside

Walter Bentley

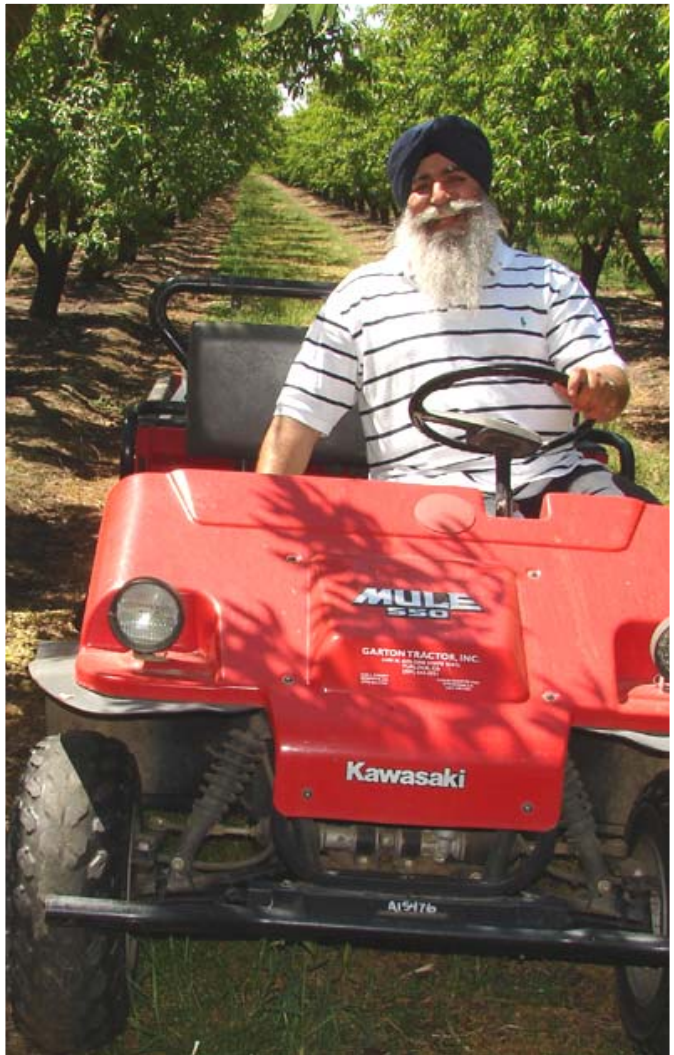
University of California Kearney Agricultural Center, Parlier

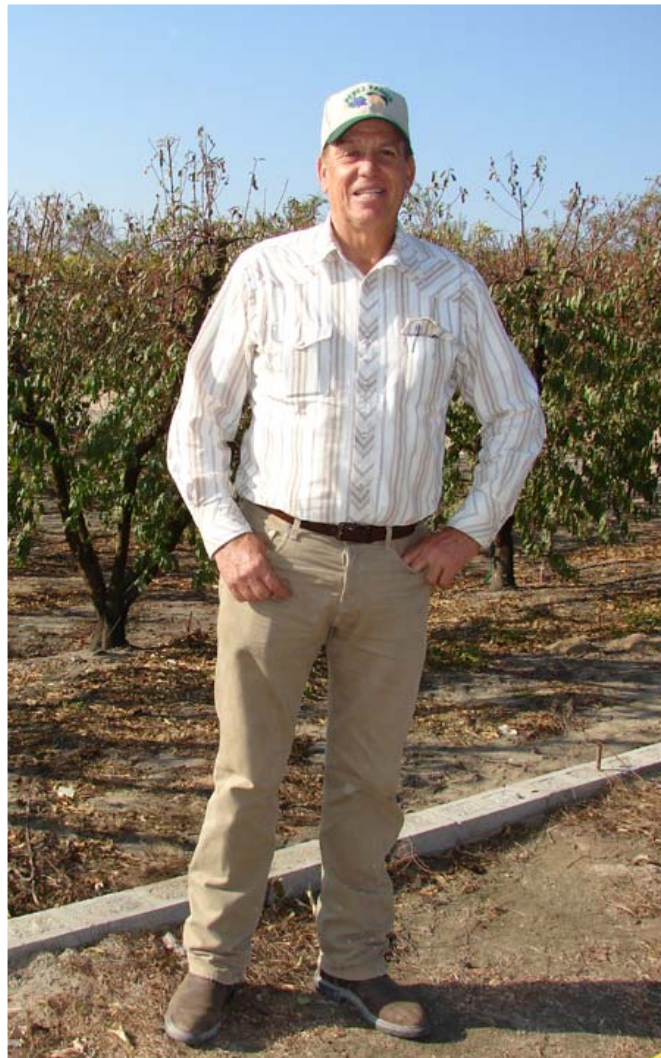
Insects and Mites in Peaches

- 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


Seasonal Guide
to Environmentally Responsible
Pest Management Practices in
Peaches and Nectarines
University of California
Agriculture and
Natural Resources
Publication 21625

We found several willing growers





Thanks to:

- Glenn Arnold
- Don de Boer
- Darrell DiGiovanni
- John Johnston
- Harvinder Kullar
- Sid & Scott Long
- Garret Nydam
- José Perez
- Lonnie Slaton
- Bill Thompson
- Blaine & Ben Yagi

Outline

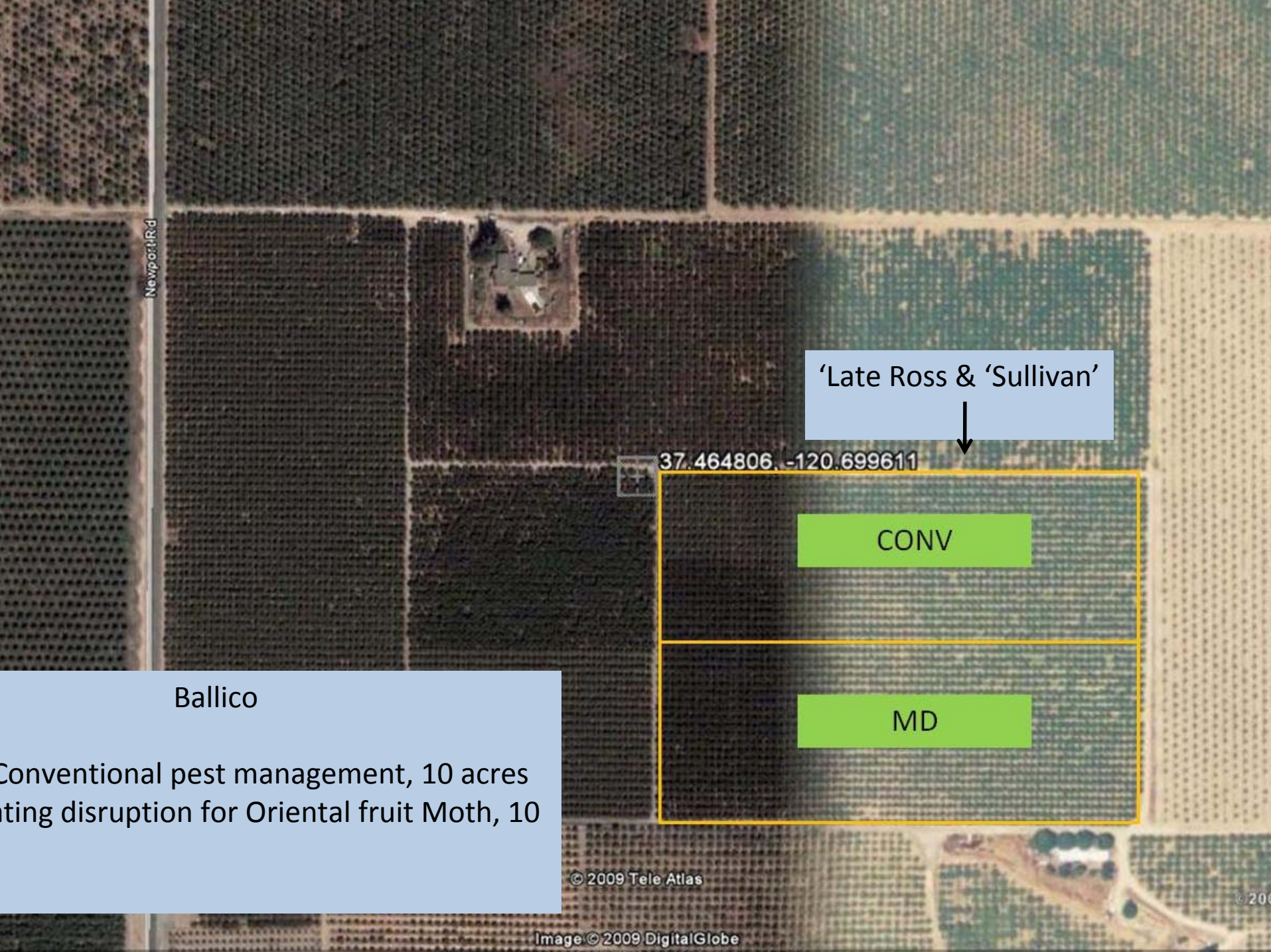
- Demonstration plots
- Treatment plan
- Summary of results
  - San Jose scale
  - Moths: oriental fruit moth, peach twig borer, oblique-banded leafroller, omnivorous leafroller
  - Spider mites
  - *Macrocentrus* and other natural enemies

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.)

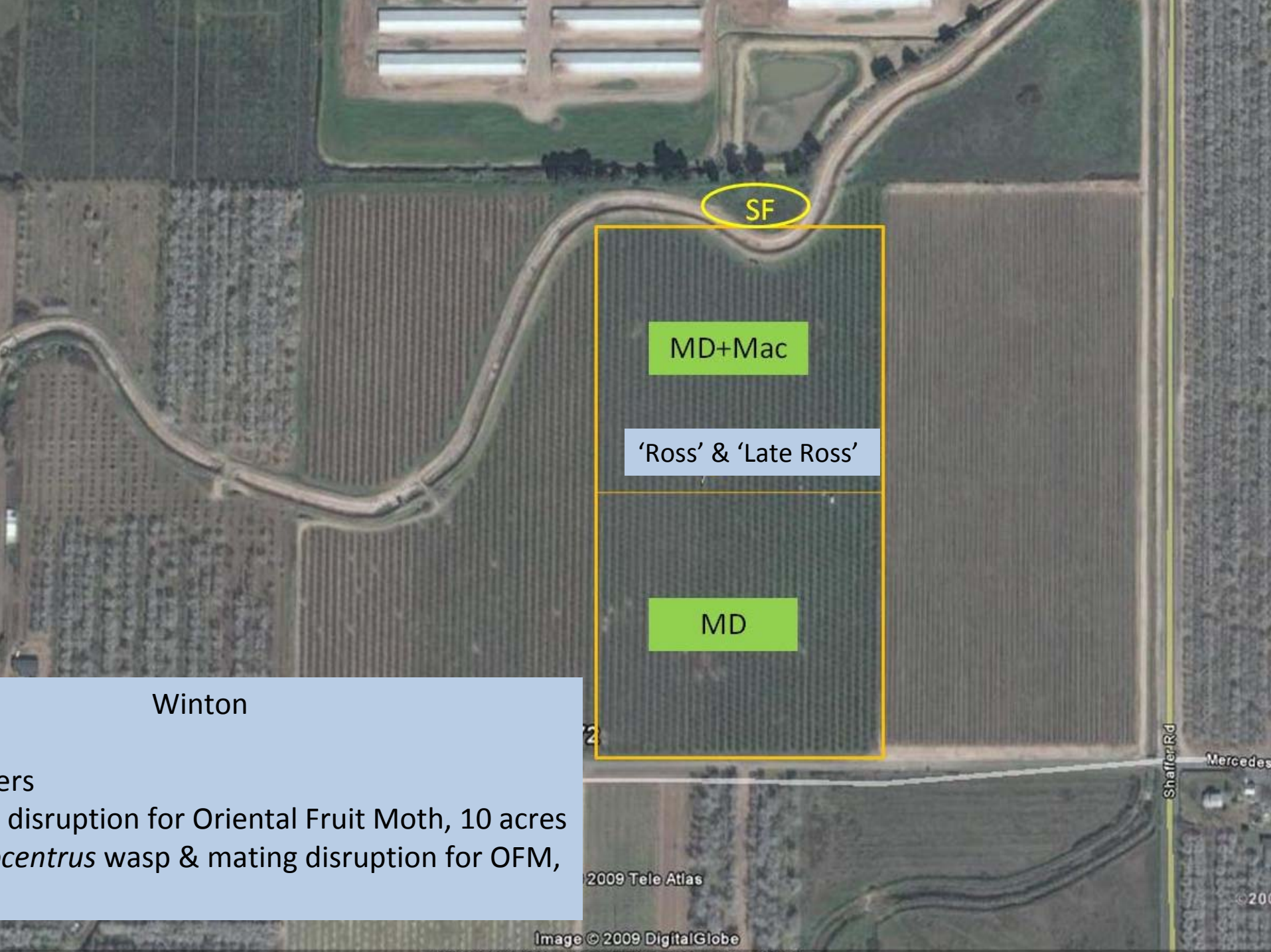
Insects and Mites Monitored

- San Jose Scale and its natural enemies
- Oriental fruit moth
- Peach twig borer
- Oblique-banded leafroller
- Omnivorous leafroller
- Spider mites and their predators
- Sunflower moth and *Macrocentrus*
- General orchard predators



Ballico

Conventional pest management, 10 acres
ting disruption for Oriental fruit Moth, 10

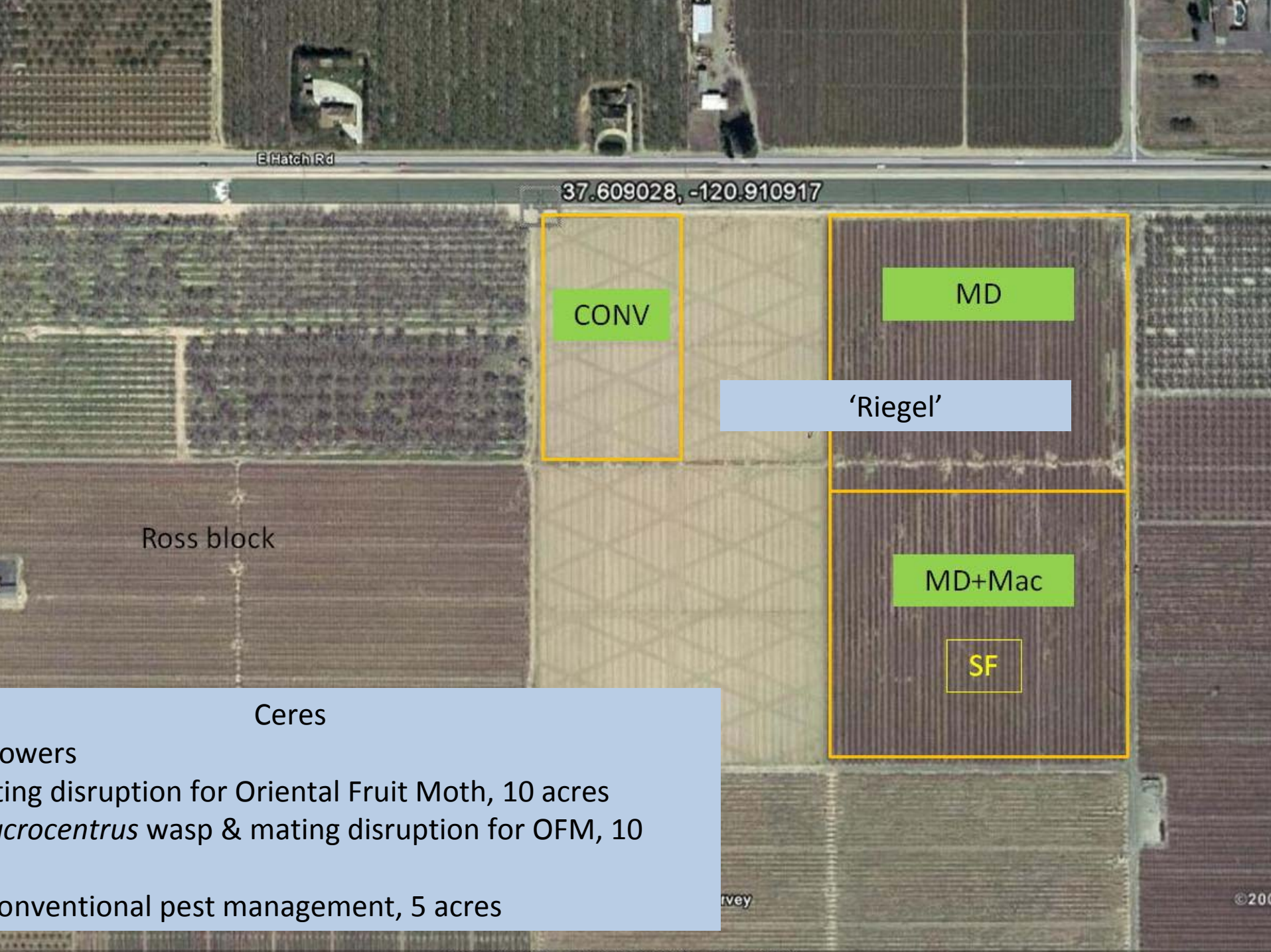


Winton

ers

disruption for Oriental Fruit Moth, 10 acres

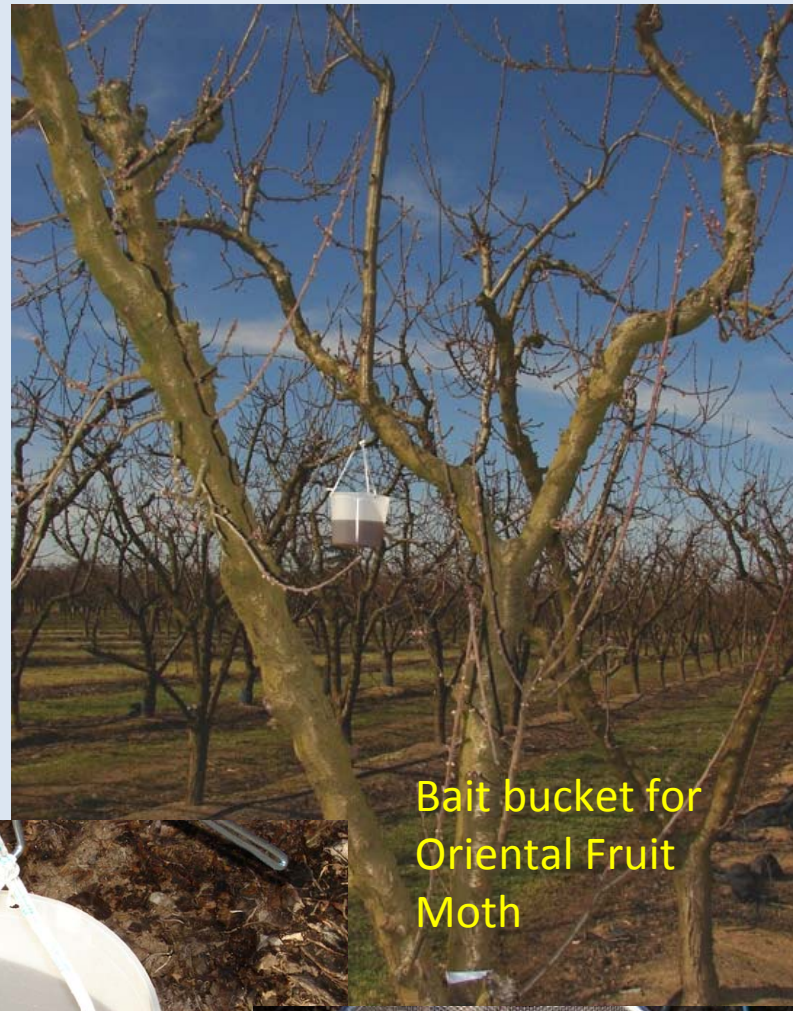
centrus wasp & mating disruption for OFM,

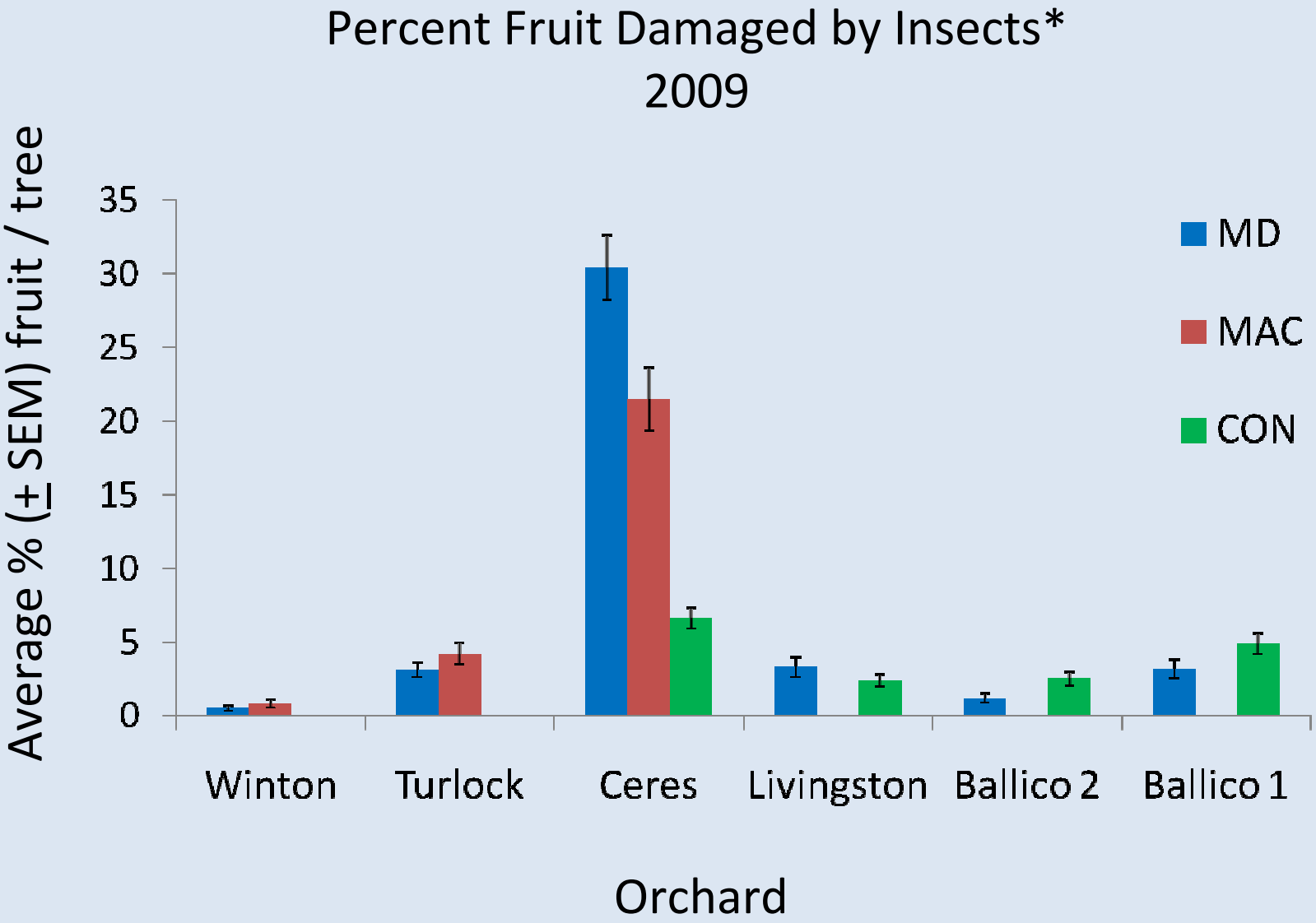

E Hatch Rd
37.609028, -120.910917
CONV
MD
'Riegel'
Ross block
MD+Mac
SF
Ceres
owers
ting disruption for Oriental Fruit Moth, 10 acres
crocentrus wasp & mating disruption for OFM, 10
onventional pest management, 5 acres

Traps


San Jose Scale


Delta pheromone trap
for 4 moth spp.


Bait bucket for
Oriental Fruit
Moth

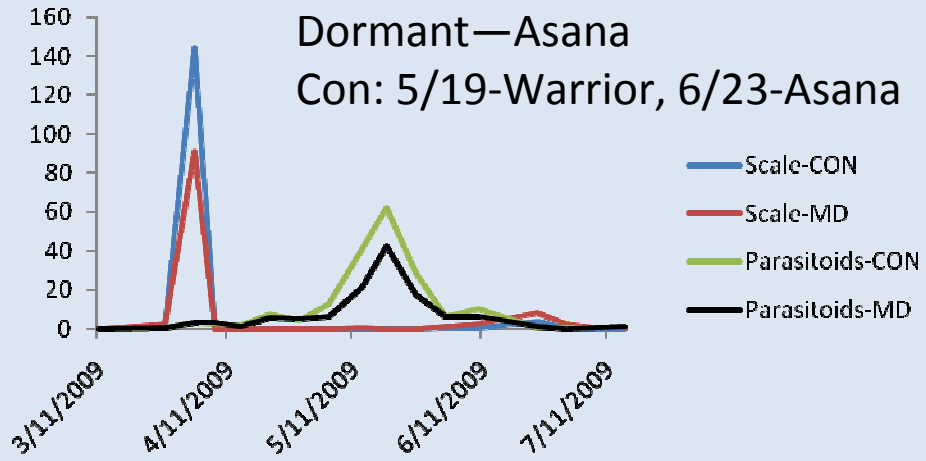


50 fruit per tree examined on 20 trees per plot, 1-3 weeks before harvest

* Unidentified damage excluded

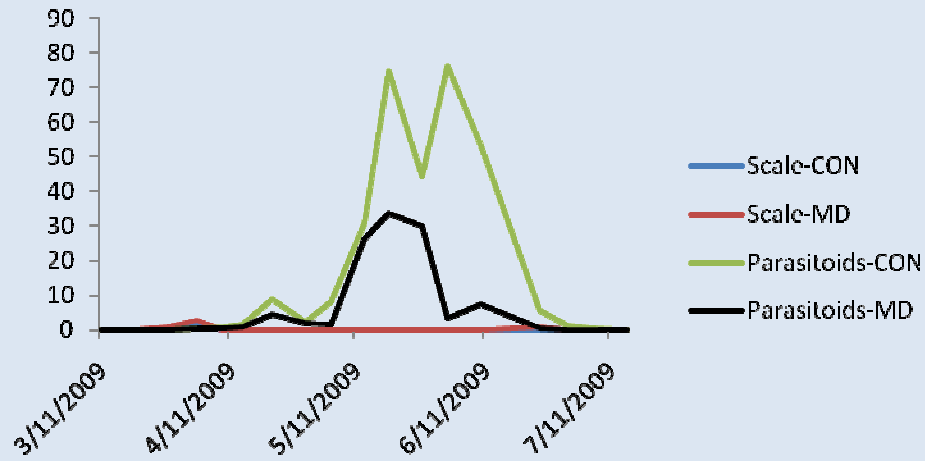
San Jose Scale and Natural Enemies
Conventional and Mating Disruption Plots

San Jose Scale and Parasitoids, Ballico-1

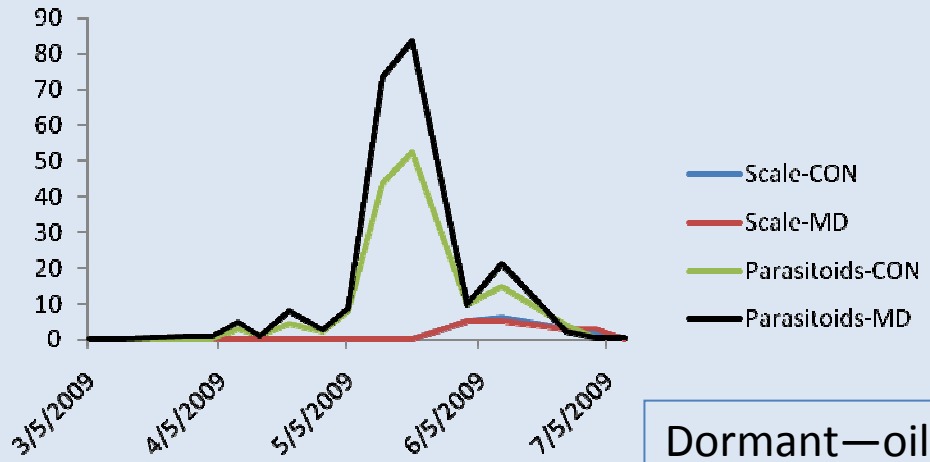


Dormant—Asana
Con: 5/19-Warrior, 6/23-Asana

San Jose Scale and Parasitoids, Ballico-2



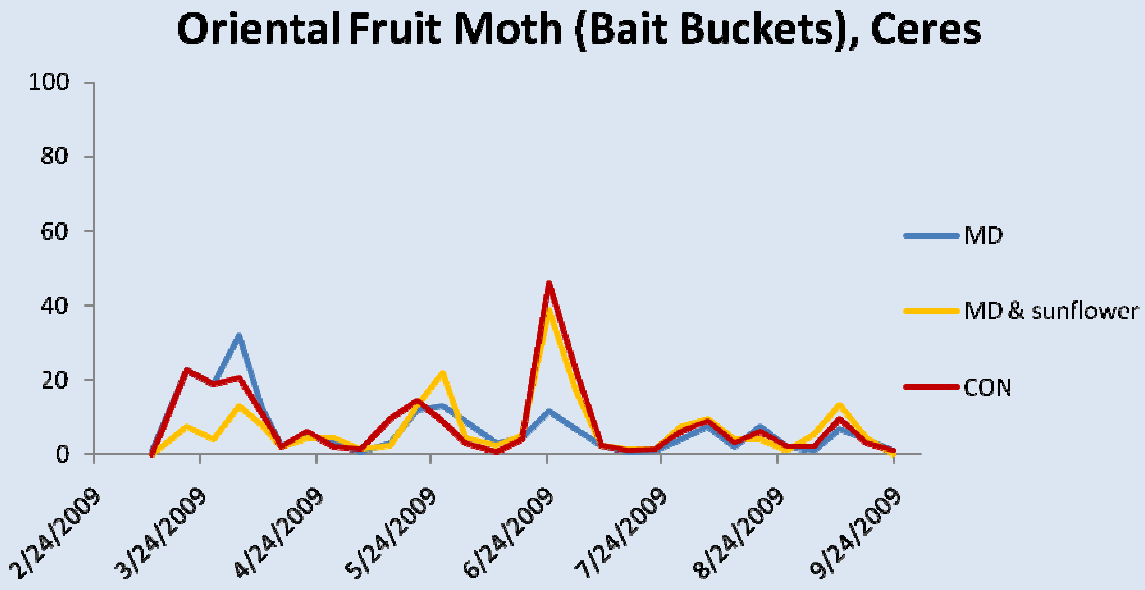
San Jose Scale and Parasitoids, Livingston



Dormant--oil,
Asana
5/23-Asana

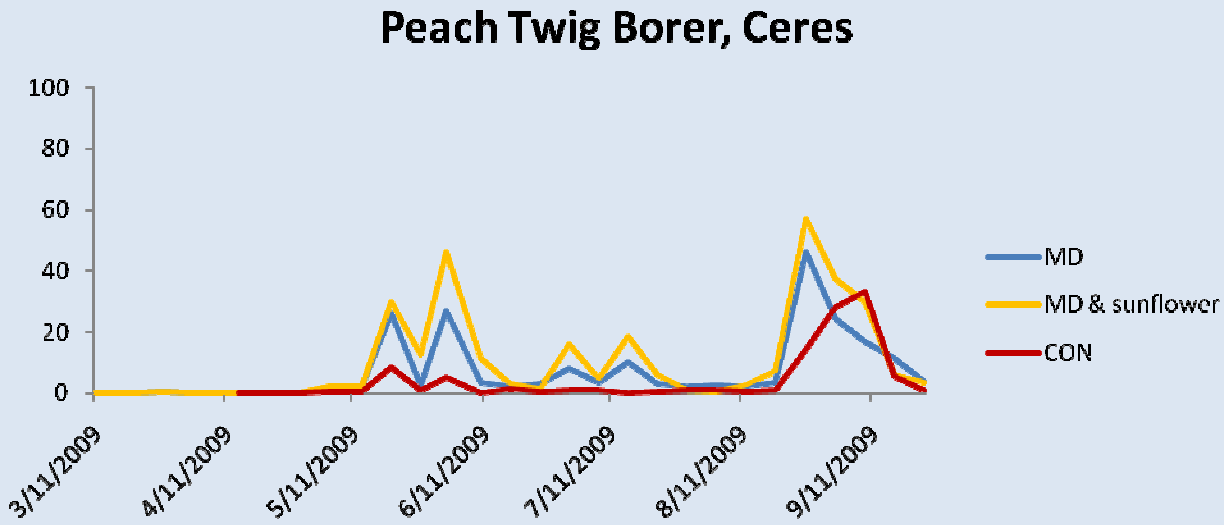
Dormant—oil
2/9—oil

No fruit damage due to scale



Conventional

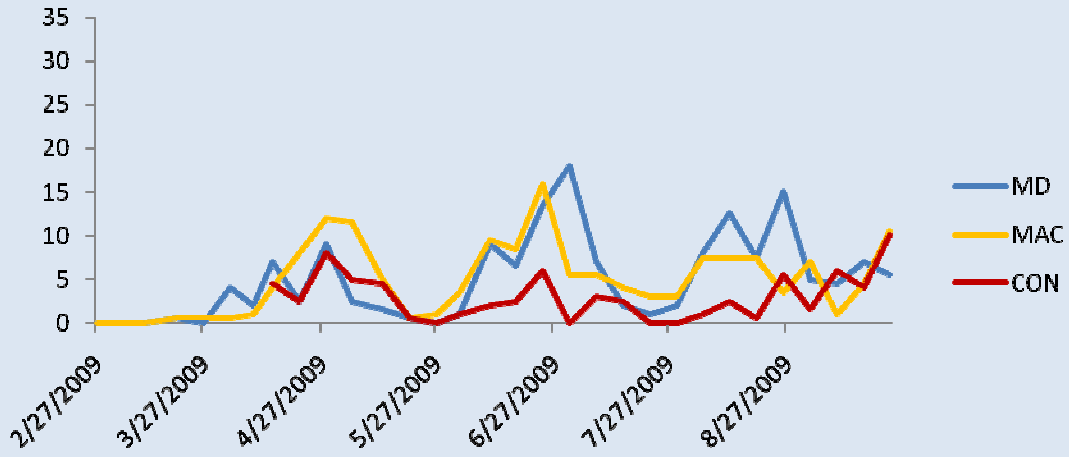
Dimilin 2/26
Intrepid 4/13
Silencer 5/23
Altacor 7/1



MD

Isomate 2/27
Dimilin 2/28
Altacor 7/1

Ominvorous Leaf Roller, Ceres



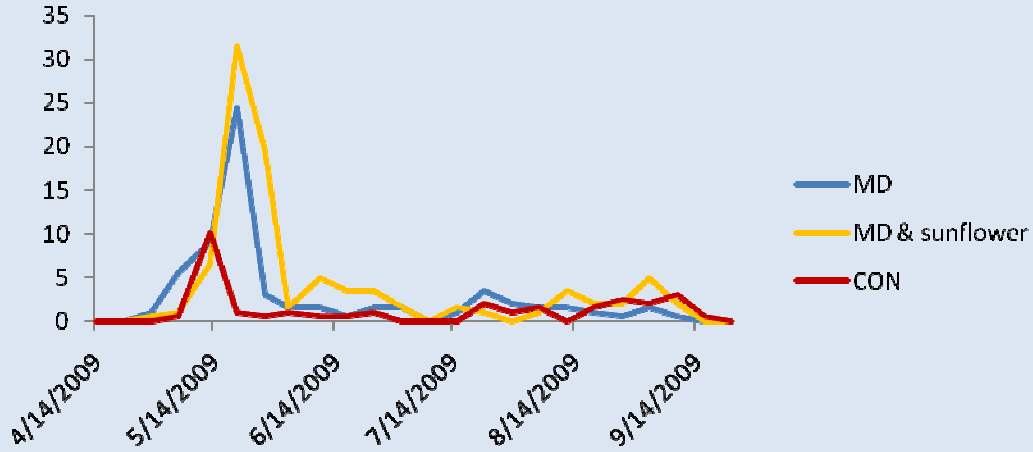
Conventional

- Dimilin 2/26
- Intrepid 4/13
- Silencer 5/23
- Altacor 7/1

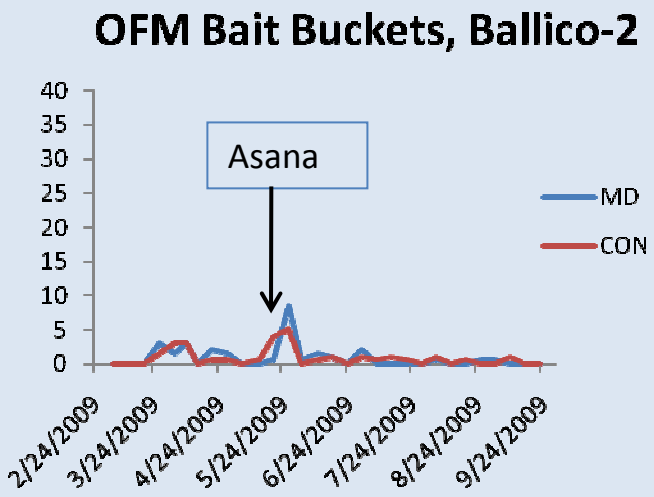
MD

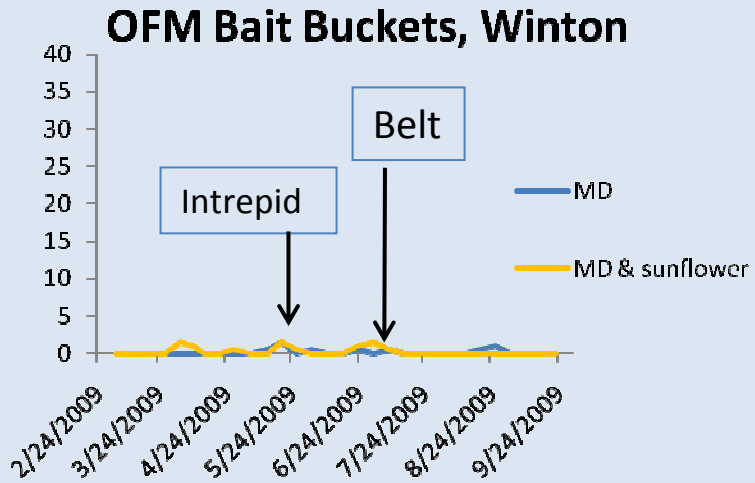
- Isomate 2/27
- Dimilin 2/28
- Altacor 7/1

Oblique-Banded Leaf Roller, Ceres

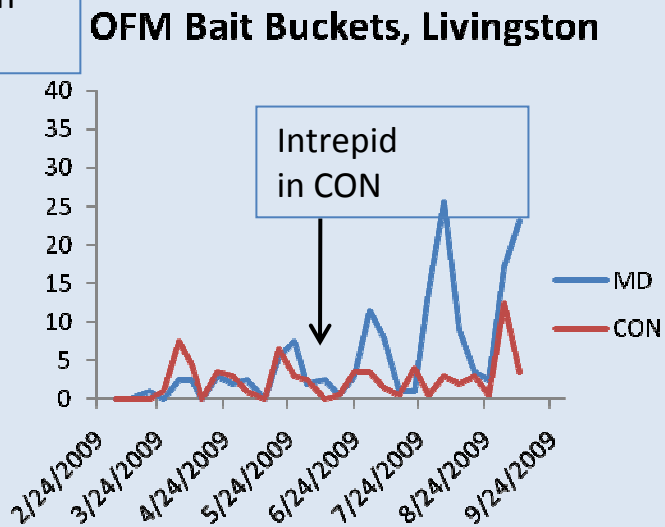


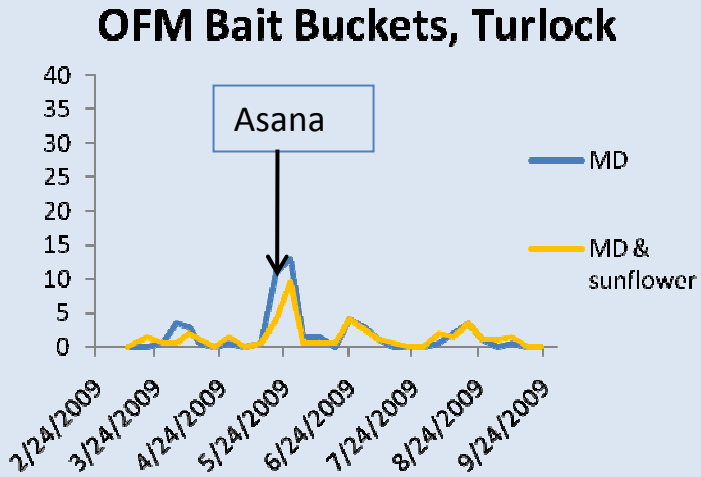
Oriental Fruit Moth
(Bait Bucket Monitoring)



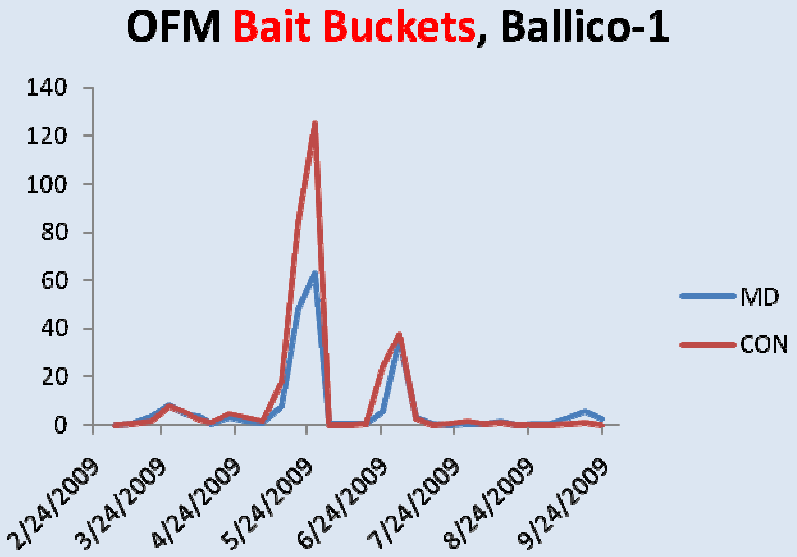


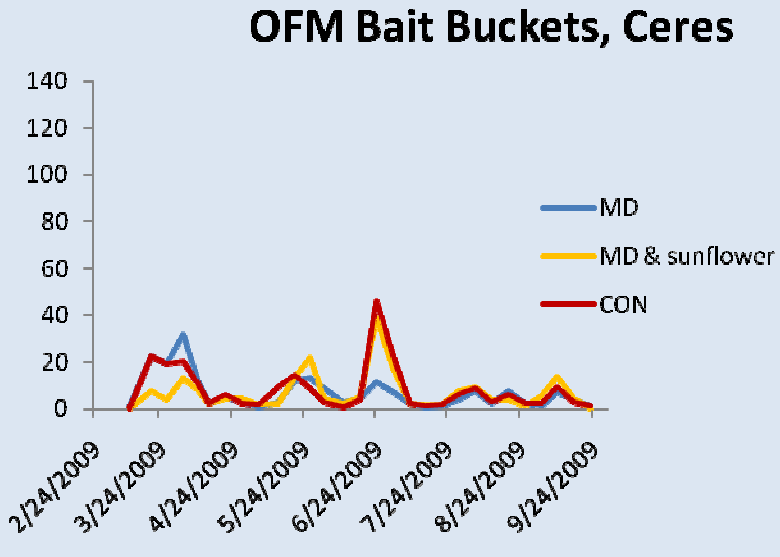
Dimilin
12/08

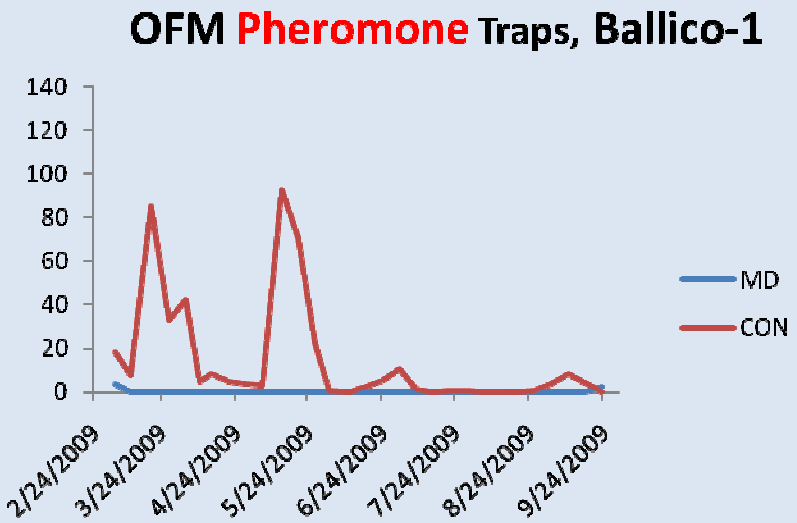


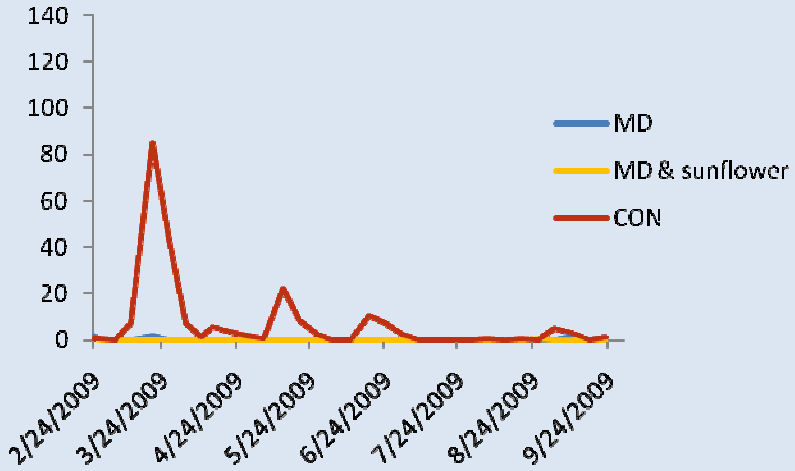


Bait buckets are less reliable for overwintering generation of oriental fruit moth in early spring





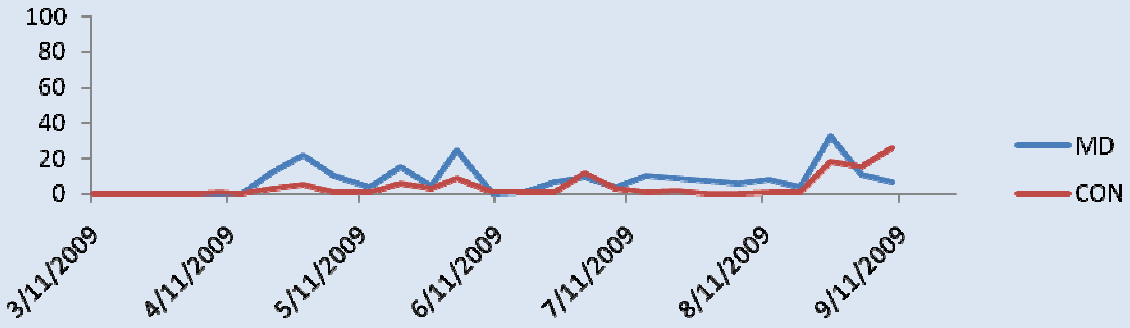




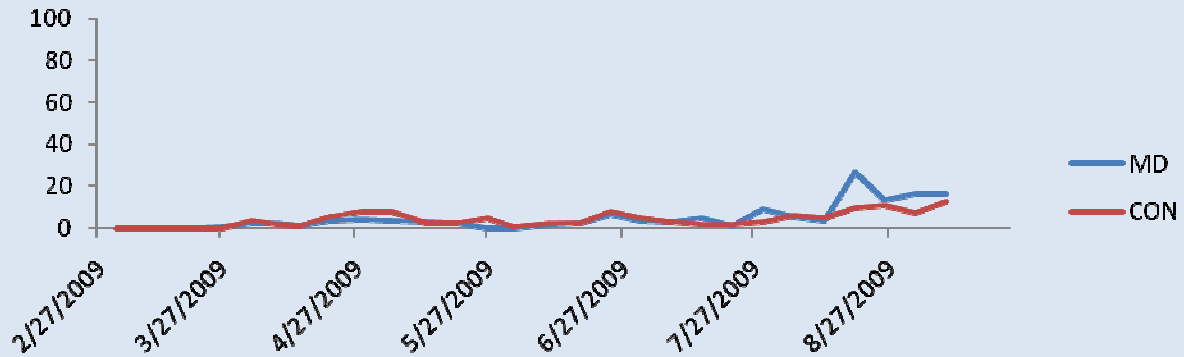
Dormant--
Dimilin

Intrepid
in CON
6/9

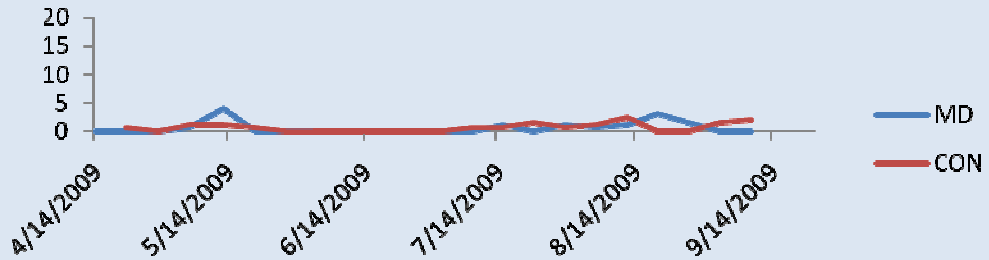
Peach Twig Borer, Livingston



Ominvorous Leaf Roller, Livingston



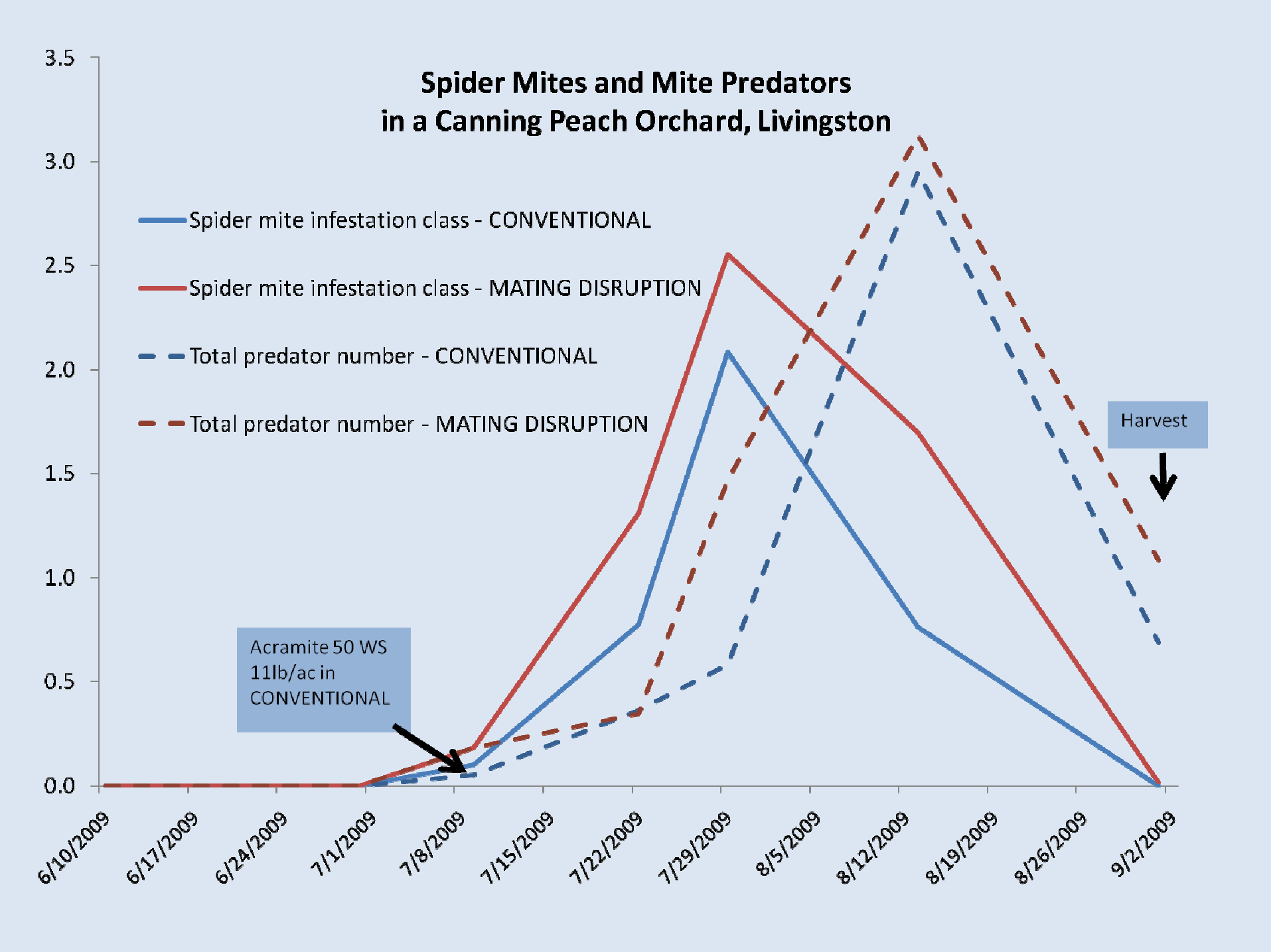
Oblique-Banded Leaf Roller, Livingston



Webspinning spider mites

Predators

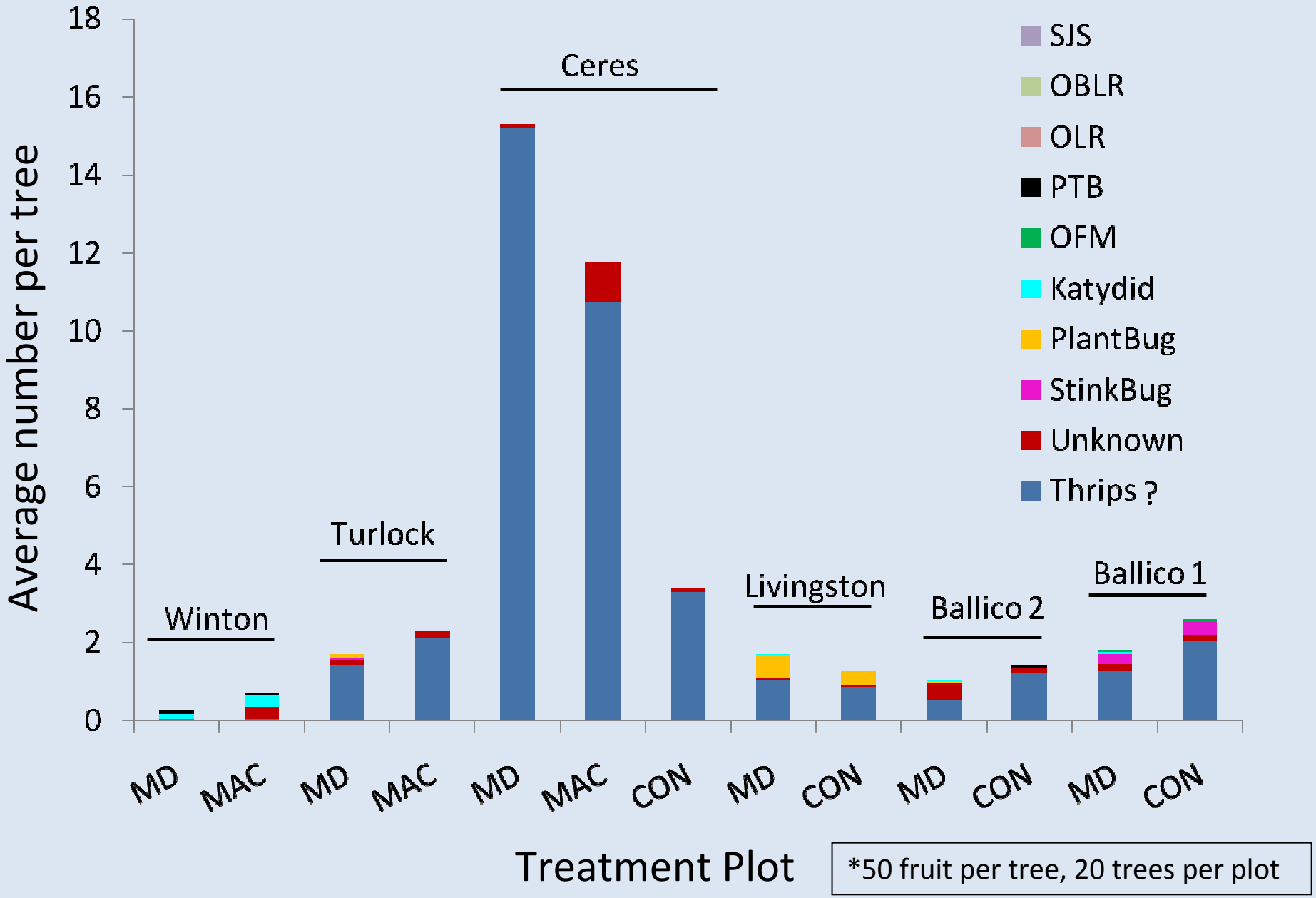
- Western predatory mite
- Six-spotted thrips
- Spider-mite destroyer
- Lacewing larvae


Spider Mites and Mite Predators
in a Canning Peach Orchard, Livingston
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
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
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

Sunflowers and *Macrocentrus*

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

Average Fruit per Sample* Damaged by Various Insects (2009)



*50 fruit per tree, 20 trees per plot

Fruit Damage

- Little or no detectable damage from OFM, PTB, OLR, or scale in any orchard
- Most damage might be due to thrips or OBLR (?) , but this needs to be confirmed in 2010.

Thrips damage identified by Jack Dibble

Thrips or OBLR Damage?

Oblique-banded leaf roller

Ceres: Oblique-banded leaf roller?

Surprises Along the Way

Probably Fuller Rose Beetle


SFR
MD-2
unk