

Evaluating ANR's mission through the lens of mating disruption in nut crops

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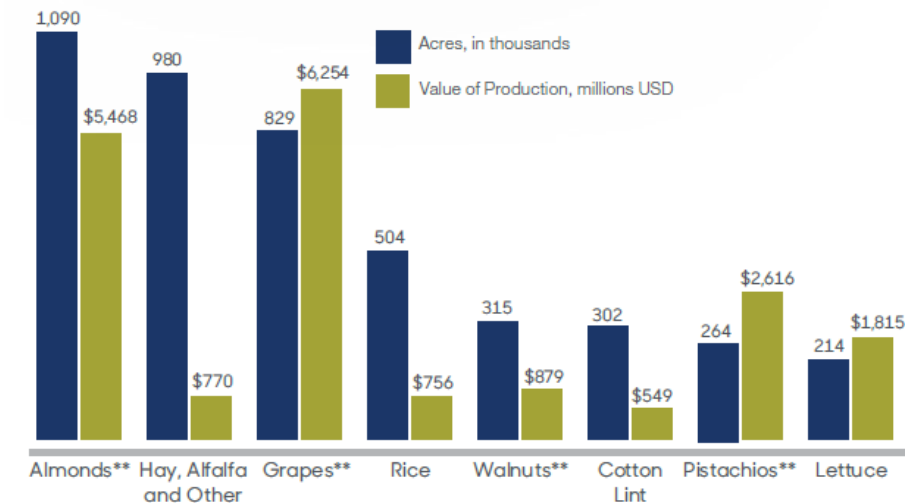


The setting- California almond orchards

Almonds are...

- California's #1 crop by acreage
- California's #1 ag export
- California's #2 crop by value
- The #1 specialty crop export in the U.S.
- Grown by more than 7,600 farmers
- There are currently more than 100 million almond trees in California that produce >2.5 billion pounds of nuts with >\$6 billion annually.

Top Ten California Crop Acreage and Value of Production



The antagonist- navel orangeworm

- The arch nemesis of nut growers
- Pest of almond, pistachios and walnuts
- Feeds exclusively on kernels
- Vectors fungi that produce aflatoxins
- Control costs in almonds ~\$380 million/yr
- Plus ~60 million in quality losses
- Approximately 18 billion nuts are eaten by NOW each year



The protagonists

- Campus-based scientists
- UCANR/UCIPM
 - David Haviland
 - Jhalendra Rijal
 - Emily Symmes
 - Pomology advisors
- Almond Board of California
- Growers/PCAs
- Agrochemical industry
- Department of Pesticide Regulation



The conflict- Status quo of management

- IPM programs not adequate
- Winter sanitation
 - Becoming cost-prohibitive
- Timely harvest
 - You can only sake a tree when it is ready
- Insecticide programs
 - Only three options available
 - Some have environmental concerns
 - Some kill natural enemies
 - Becoming less effective
 - Nothing in the pipeline



The hero... Mating disruption!

Principle

- You don't have to kill an insect that was never born in the first place.

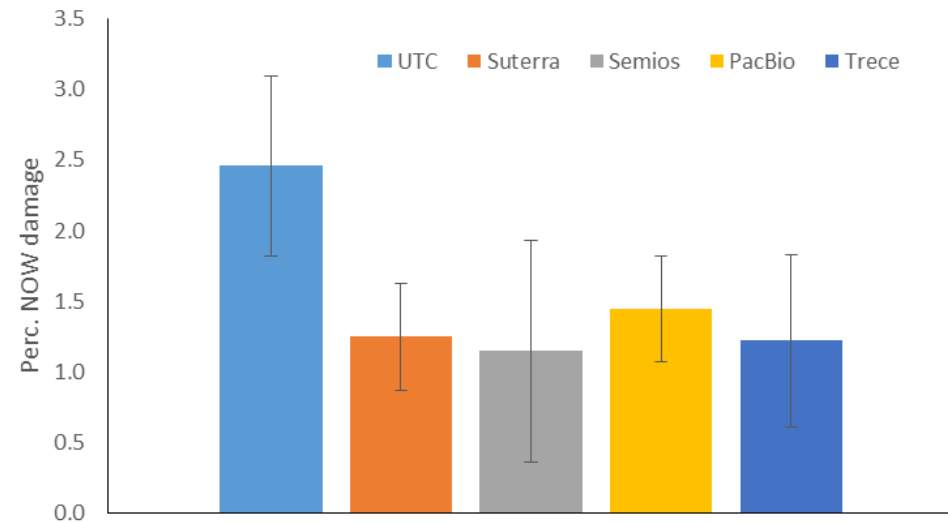
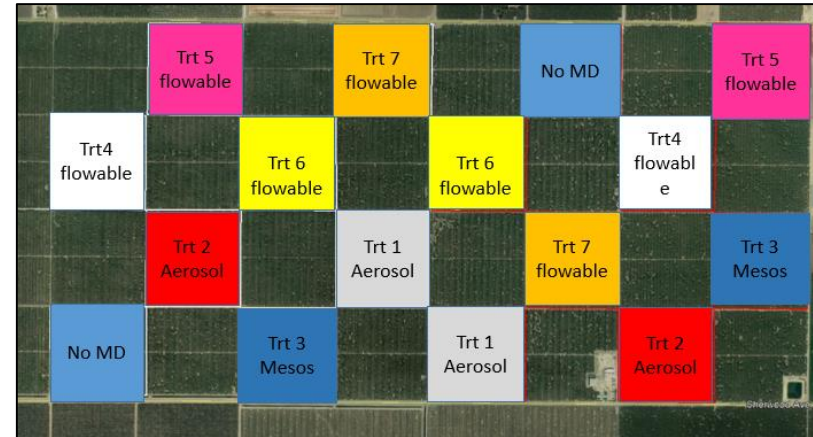
Profile

- Safe for humans
- Safe for the environment
- Not a traditional pesticide



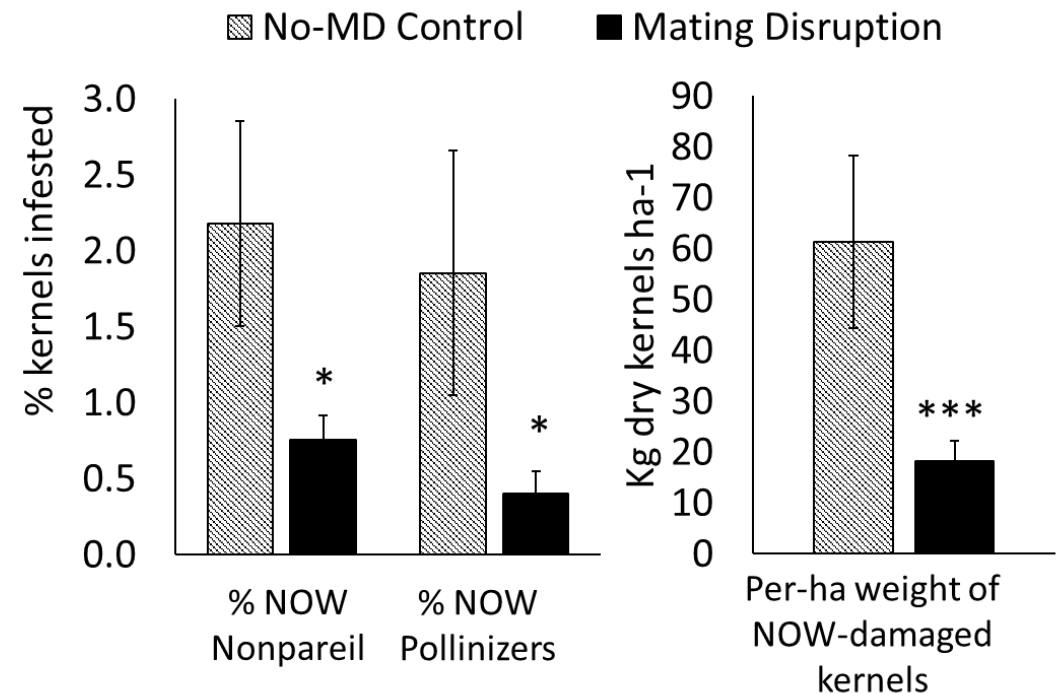
Plotline (the middle chapters)

1. Determine if it works
2. Assess the consistency of results on commercial scale
3. Determine costs and benefits
4. Deliver the information



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12 demonstration sites
4 counties over 2 years
Committee-defined demonstrations

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- 3. Determine costs and benefits**
4. Deliver the information

If you DID NOT use MD

- If $<1\%$ damage, your investment didn't pay off
- If 1% damage, you broke even
- If $>1\%$ damage, you made money by investing in MD

If you DID use MD

- If $<0.5\%$ damage, your investment wouldn't have paid off
- If 0.5% damage, you would have broke even
- If $>0.5\%$ damage, you would have made money by investing in MD

Plotline (the middle chapters)

1. Determine if it works
2. Assess the consistency of results on commercial scale
3. Determine costs and benefits
4. **Deliver the information**



- >150 presentations in 36 cities, 20 counties, to more than 20,000 people
- >50 extension publications on almond IPM
- Demonstration videos and workshops

The climax and resolution (impacts)

1. Annual increases in adoption for 5 straight years
2. Adoption by almond, pistachio and walnut growers
3. Currently adopted on ~45 million trees
4. 5 million pounds of kernels saved annually
5. 1.7 billion kernels eaten annually by people, not worms
6. At no added cost to growers
7. Using a green, sustainable technology



UC ANR: Our Public Value



Water quality,
quantity and
security



Endemic and
Invasive Pests and
Diseases



Sustainable Natural
Ecosystems



Sustainable Food
Systems

UC ANR Strategic Initiatives

Healthy Families
and Communities



- **Economic prosperity**
- **Qualified workforce**
- **Abundant and healthy food**
- **Protecting natural resources**
- **Healthy people and communities**
- **An inclusive and equitable society**