The Almond Pest Management Alliance

- A Statewide Research and Extension Program

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The California Almond Industry

- ~ 600,000 acres
- Over 1 billion pounds / season
- 70 - 80% of world's supply
- CA's highest value export crop
- US's highest value export crop

Almond Pest Management

Insects & Mites

Primary

- Naval orangeworm
- Peach twig borer
- Ants
- San Jose scale
- Brown almond & European red mites
- Web spinning mites

Secondary

- Oblique-banded leafroller
- Peach tree borer
- Plant bugs
- Leaf hoppers

Almond Pest Management

Diseases

Foliar

- Brown rot
- Shot hole
- Scab
- Rust
- Anthracnose
- Hull rot

Trunk & Branch

- Phytophthora root & crown rot
- Oak root rot
- Ceratocystis canker
- Bacterial canker
- Silver leaf
- Almond leaf scorch

“Treat your trees every year for peach twig borer with a dormant spray of oil and organophosphate insecticide...”

Integrated Pest Management for Almonds

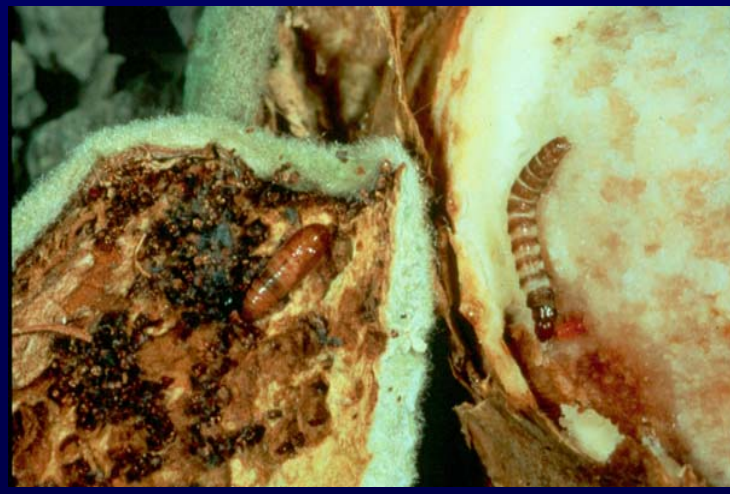
University of California Integrated Pest Management Program
1985

"Typical" Almond Insecticide Spray Program

- Dormant spray of oil, copper, organophosphate
  - peach twig borer
  - San Jose scale
  - brown almond mite
  - European red mite
  - oblique-banded leaf roller

"Typical" Almond Insecticide Spray Program

- May spray
  - peach twig borer (OP or pyrethroid)
  - San Jose scale (OP)
- Hull split spray (July)
  - navel orangeworm (OP or pyrethroid)
  - peach twig borer (OP or pyrethroid)
  - web spinning mites
- Ant spay
  - Lorsban (August)



Impetus for finding alternative or "reduced risk" practices

- Food Quality Protection Act
- Pesticide residues in waterways of the state
- Farm worker safety
- Pesticide resistance
- Economics

Almond Pest Management Alliance

Alliance of:

- University of California Cooperative Extension
- UC Statewide IPM Project
- Almond Board of California
- Almond Hullers and Shellers Association
- Community Alliance for Family Farmers

Funded by a $500,000 grant by the California Department of Pesticide Regulation

Almond PMA

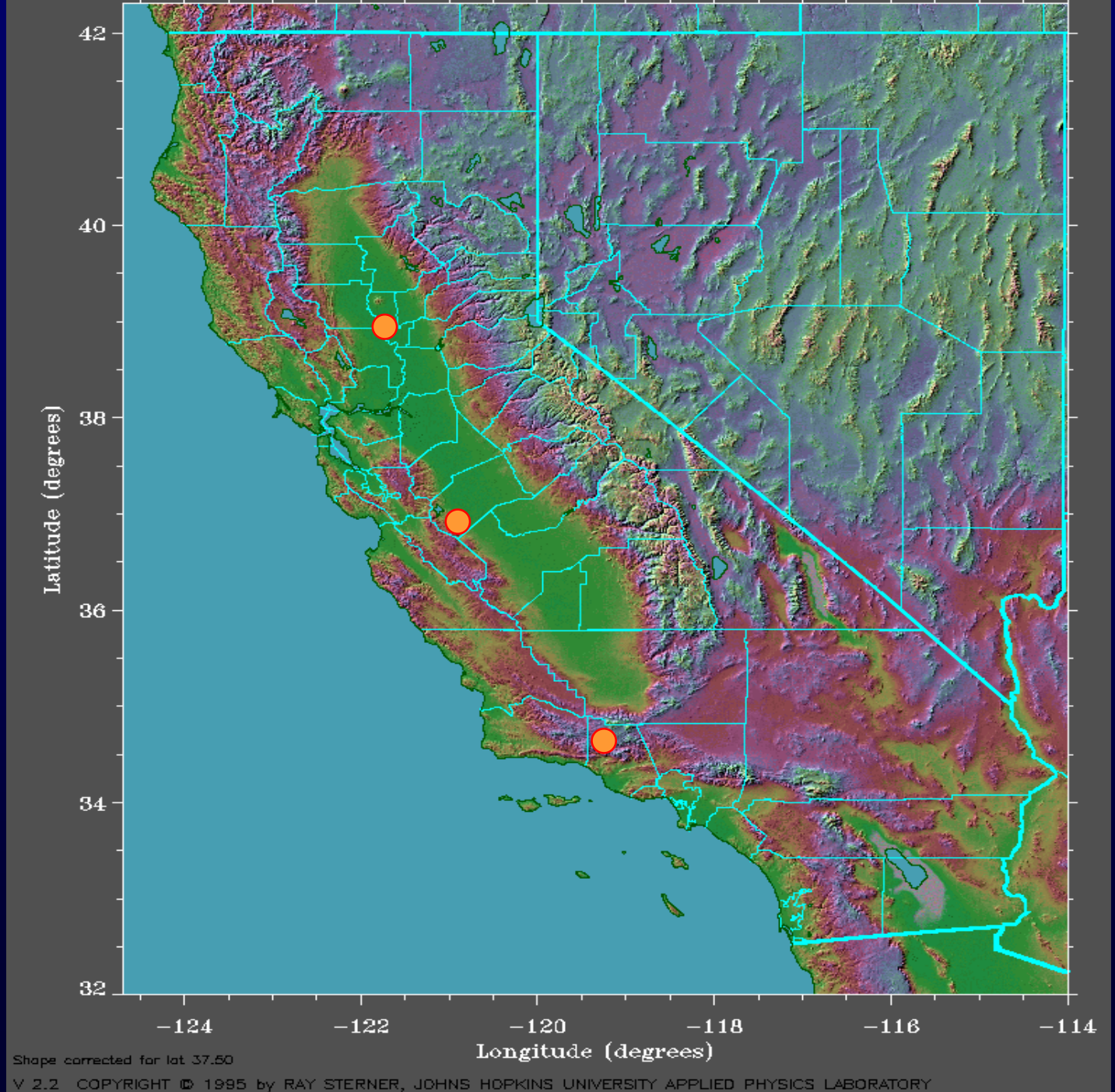
Objectives:

1) To scientifically evaluate the effectiveness and economic viability of pest management programs using less broadly toxic pesticides over the long term.

2) To demonstrate IPM monitoring techniques and decision making processes to growers and PCAs.

PMA Methods

- Establish three research / demonstration sites in primary almond producing areas of the state
- Conduct commercial scale experiments in cooperation with local growers and PCAs
- Have statewide information exchange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Experimental Design

- Compare “conventional” and “reduced risk” programs
- Monitor populations of important pest and beneficial arthropod species
- Document population shifts over five years (1999-2003)
- Track monetary inputs in each program

Extension of Information

- Involve respected local growers and PCAs in trials
  - Coffee shop gossip
- Two “field days” or workshops per year in each region (30 total workshops over 5 years)
- Farm Advisor (county) newsletters
- Statewide quarterly newsletter mailed to all growers
- Mass media (trade magazines & local newspapers)
- PMA website

Information Extension Included:

- Updates on trial results
- Basic insect ID, biology and control
- Basic and advanced monitoring techniques
- The use of economic thresholds for decision making
- Success & failure stories by growers / PCAs
- First field day included free tri-tip BBQ!

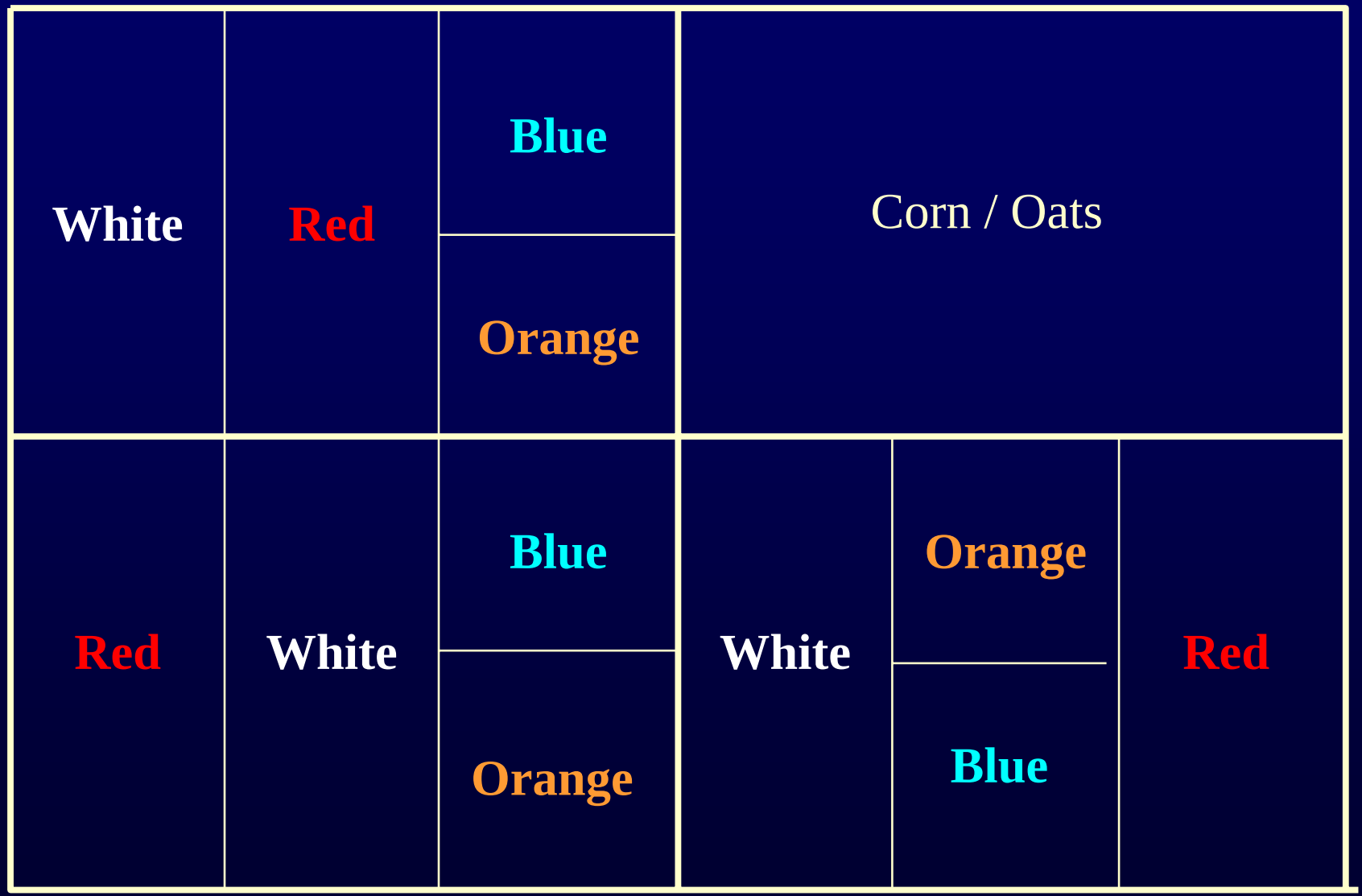
Field & Classroom Lectures

Hands on Learning

The Stanislaus County Trial

- 120 acre commercial orchard
- Four pest management programs
  - grower's standard (standard use of Ops, pyrethroids, miticides)
  - "reduced risk" #1 (dormant oil, IGRs, ant bait, RR miticides)
  - "reduced risk" #2 (dormant oil, Bt, ant bait, oil for mites)
  - untreated (added after two years)

120 Acres of Nonpareil / Carmel

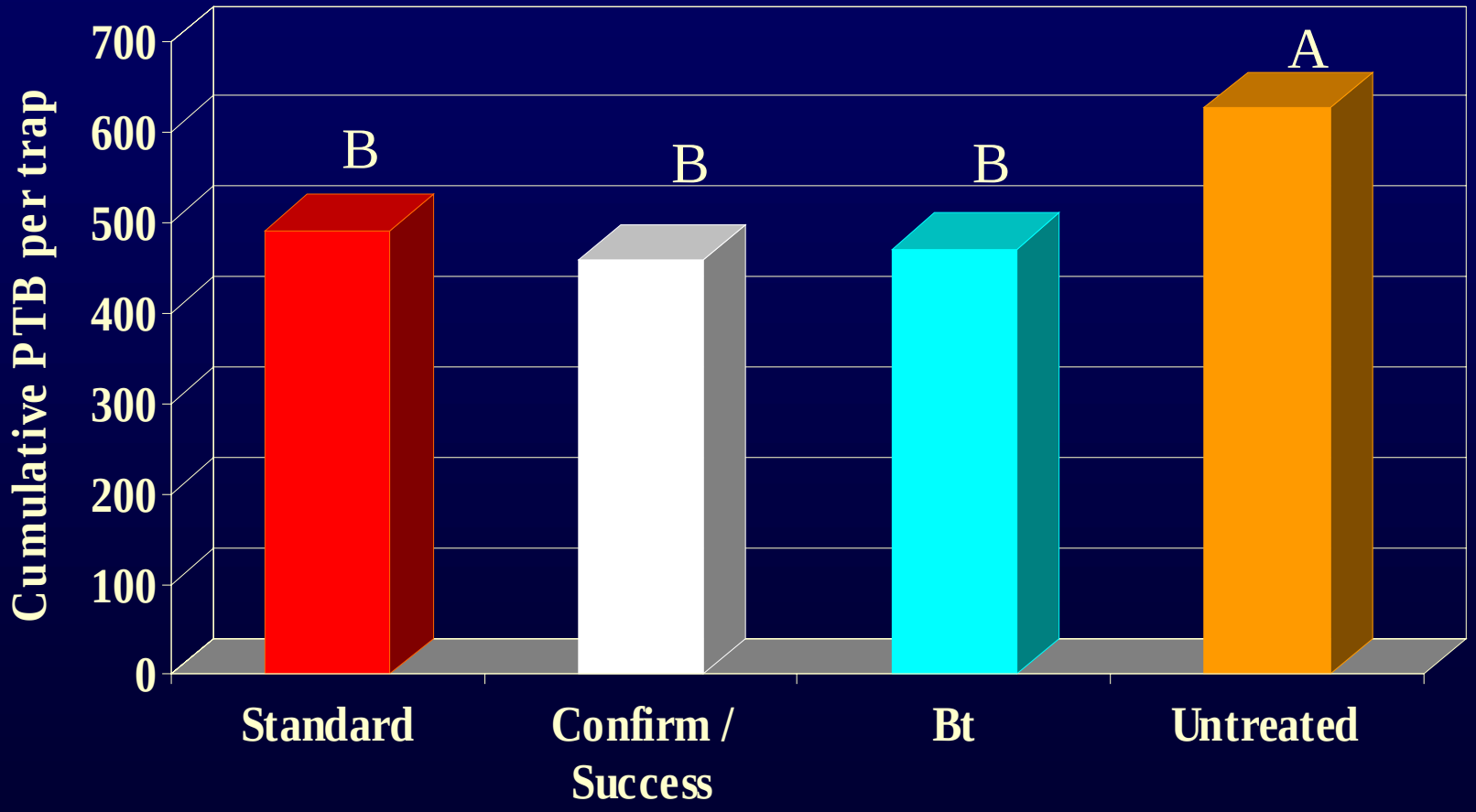


PMA Monitoring Program

- **Total of 126 traps monitored weekly**
  - **PTB - total of 18 traps checked twice weekly**
  - **NOW - total of 18 traps checked weekly**
  - **San Jose scale & parasites- 18 traps checked weekly**
  - **S. J. scale crawler traps - 72 traps checked weekly**
- **Web spinning mites monitored every 2 weeks June - Aug.**
- **3600 - 6000 nuts cracked out at harvest**
- **Ants periodically baited with hot dogs**
- **S. J. scale adults checked on spurs each fall**

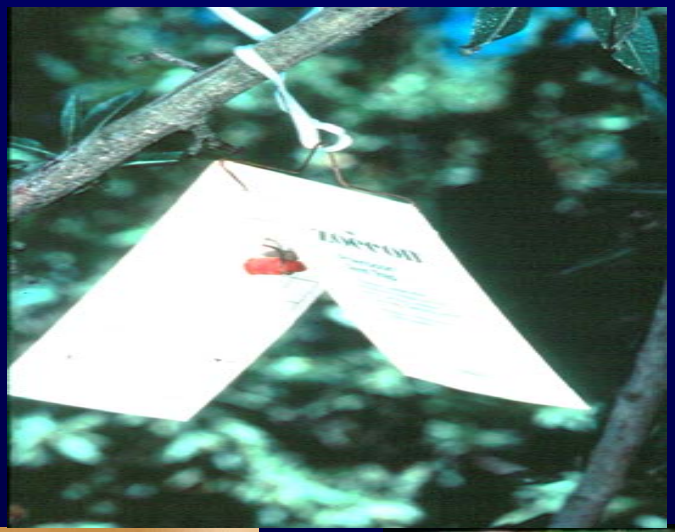
Peach Twig Borer Populations as Related to Pesticide Program - 2003

Season Total of Peach Twig Borer per Trap
Stanislaus County PMA Trial, 2003

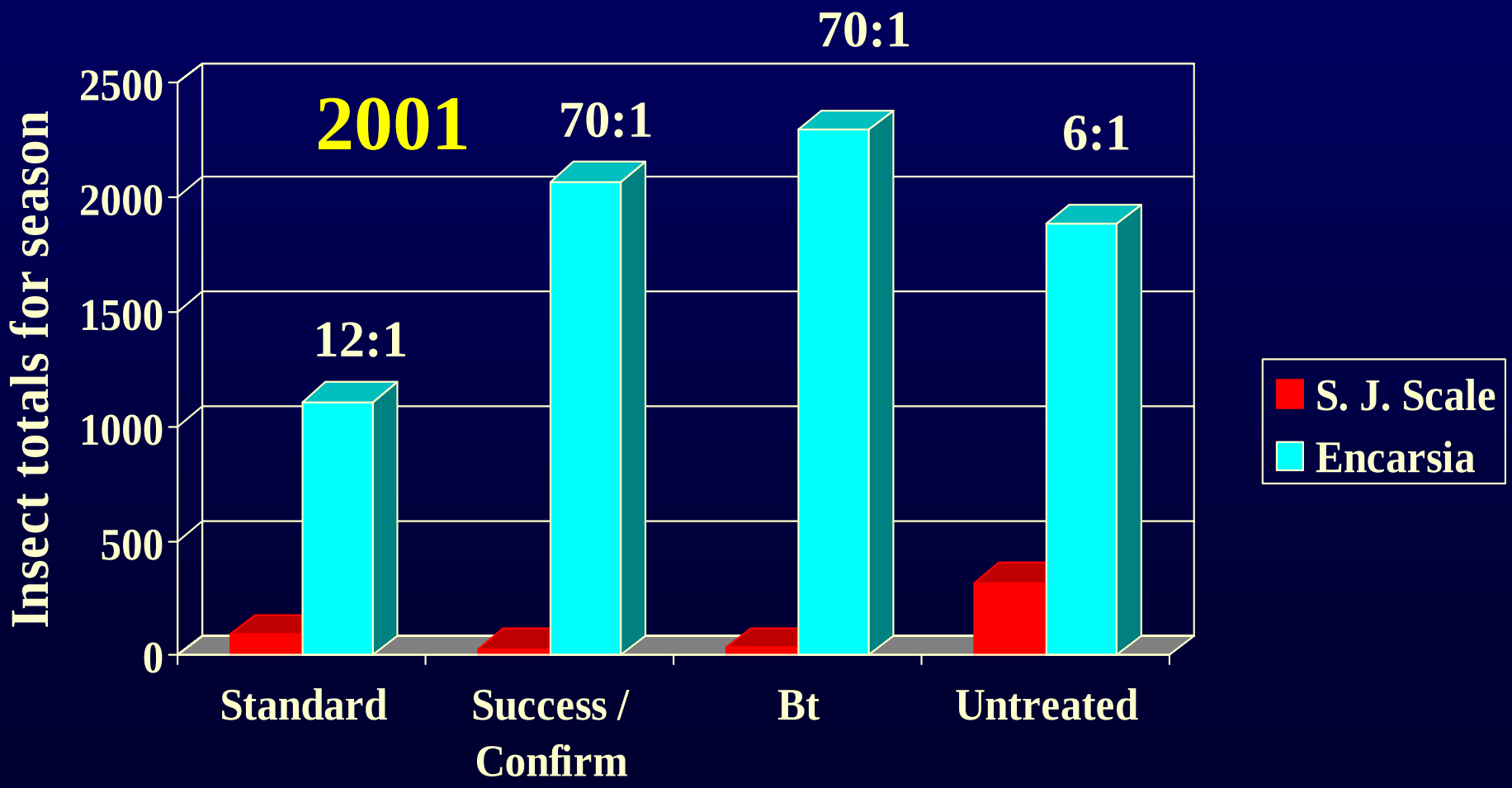


Statistically significant - but agronomically??

Monitoring San Jose Scale and Parasites



San Jose Scale & Scale Parasite Populations as Related to Treatment



Stanislaus PMA
Nonpareil Harvest Rejects - 2003

Average of 900 nut samples for each treatment

	% NOW	% PTB	% Ant	Total Rejects
Standard	0	0.1	0.0	0.1
Success	0	0	0.6	0.6
Bt	0	0	0.6	0.6
Untreated	0	0.1	0.6	0.7

Huller / sheller reject analyses averaged 0.7% for all 120 acres

Per Acre Insecticide Spray Costs. 2003

Includes $13.65 per acre application costs.

Standard	Dormant	57.98
	May	33.77
	Total	**$91.75**
Confirm/ Success	Dormant	50.61
	Bloom	25.77
	May	37.07
	Total	**$113.45**
Bt	Dormant	31.05
	Bloom	48.90*
	May	48.90
	Total	**$128.85***
Unsprayed	**Total**	**$0.00**

*Bt applications did not coincide with bloom-time fungicide applications in 2003 and necessitated extra application costs.

Five Year Trial Summary "In a Nutshell"

- Little difference in trap catches or harvest damage between "conventional" and "reduced risk" programs for "direct injury" pests.
- San Jose scale is usually controlled very well through natural predation unless we mess it up with organophosphate sprays
- Reduced risk materials may increase costs of a pest management program

If monitoring and decision-making protocols are followed:

- Pesticide applications can be substantially reduced
- Less broadly toxic materials can be used without increased risk to the crop (or the grower)

During the five-year period of the project:

- Dormant sprays were substantially reduced
- Chlorpyrifos use reduced by 45.3% statewide
- Diazinon use reduced by 44.7% statewide

During the five-year period of the project:

- Almond Board of California received prestigious Pesticide Environmental Stewardship Program award from US EPA.
- Community Alliance for Family Farmers received award from CA Governor Gray Davis.
- UC Cooperative Extension received a 30% budget cut.

Thank You

for your attention