Pesticide Use in California: Benefits and Trends

Leonard P. Gianessi

CropLife Foundation
Data Sources

- **Benefits-** CropLife Foundation Reports
  - Herbicides- 2003, Updated 2006
  - Fungicides- 2005
  - Insecticides- For Release, June 2008
  - Fumigants- Ongoing
  - Growth Regulators- Ongoing

- **Use Trends-** Cal DPR
  - 1990-2006
CALDPR Data Project

- State-Level
- Acre Treatments
- 40 Crops
- Categories
  - Herbicides
  - Insecticides
  - Fungicides
  - Fumigants
  - Growth Regulators
Preliminary Crop Analysis

- Walnuts
- Kiwi
- Rice
- Pistachios
- Asparagus
- Lettuce
- Carrots
- Garlic
- Dates
- Olives
- Celery
- Strawberries
Walnut Blight: California

- Production losses of 50% in the early 1900’s.
- Copper sprays became standard practice in the 1940’s.
WALNUTS: Fungicide Use, Walnut Blight

- **Acre Treatments**
  - COPPER
  - MANEB
  - Total Acres

- **Years**:
Rice Blast Disease: California

- First found in the state in 1996.
- Fungicides prevent yield losses of 15-30%.

Rice Blast Spores
Garlic: Rust

First Discovered in California in 1998.
Carrots: Cavity Spot

- Fungal Infection
- Infected Carrots Unacceptable for Fresh Market
- Entire Fields have been Abandoned
CARROT: Fungicide Use, Cavity Spot

Acre Treatments

- METALAXYL
- Total Acres

Year
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006

Acres
- 0
- 20000
- 40000
- 60000
- 80000
- 100000
- 120000
Pistachios

Healthy

Panicle & Shoot Blight
PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria

Acre Treatments

- Fungicide Use
- Total Acres

Treatments

- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006

Acre

- 0
- 25000
- 50000
- 75000
- 100000
- 125000
- 150000
- 175000
- 200000
- 225000
- 250000
- 275000
- 300000
- 325000
- 350000
- 375000
- 400000

Fungicide Use

Total Acres
PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria

Acre Treatments

- BENOMYL
- COPPER

PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria
PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria

- BENOMYL
- COPPER
- IPRODIONE
- TEBUCONAZOLE

Acre Treatments

PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria

Acre Treatments

AZOXYSTROBIN
BENOMYL
BOSCALID
COPPER
IPRODIONE
PYRACLOSTROBIN
TEBUCONAZOLE
PISTACHIOS: Fungicide Use, Panicle & Shoot Blight/Alternaria

Acre Treatments


AZOXYSTROBIN
BENOMYL
BOSCALID
COPPER
IPRODIONE
PYRACLOSTROBIN
TEBUCONAZOLE
THIOPHANATE-METHYL
OLIVES: Insecticide Use

Acre Treatments

- CARBARYL
- METHIDATHION
- PETROLEUM OIL
- Total Acres

Year:
- 1990
- 1992
- 1994
- 1996
- 1998
- 2000
- 2002
- 2004
- 2006

Acres:
- 0
- 10,000
- 20,000
- 30,000
- 40,000
- 50,000
- 60,000
- 70,000
- 80,000
- 90,000
- 100,000
- 110,000
- 120,000
Olive Fruit Fly

- First noticed - 1998
- Very few natural enemies in Europe or U.S.
RICE: Herbicide Use

Acre Treatments


2,4-D
BENSULFURON
MCPA
MOLINATE
PROPANIL
THIOBENCARB
TRICLOPYR
RICE: Herbicide Use

Acre Treatments

Year


Herbicides

- 2,4-D
- BENSULFURON
- BISPYRIBAC
- CARFENTRAZONE
- CLOMAZONE
- CYHALOFOFOP
- MCPA
- MOLINATE
- PROPANIL
- THIOBENCARB
- TRICLOPYR
Unfumigated Carrots: Nematode Damage

- 25% Yield Loss w/o Fumigant Use
- Field May be Abandoned

USDA
Herbicide Experiment 1960s
Carrots: Linuron

Treated

Untreated
Asparagus Harvest: California

Asparagus is a perennial plant producing spears for 15-20 years.
U.S. Fresh Asparagus Market

- Exports
- Imports
- Production
- Consumption
Costs & Returns to Produce Asparagus, California (2007)

- Pesticide Costs
- Other Costs
- Labor Costs
- Total Costs
- Returns

$/Acre
Asparagus: Fungicide Use, Crown & Spear Rot

Acre Treatments

Acre Treatments


Fungicide Use

Total Acres
Weedy Asparagus: California

- Without weed control, it is difficult to harvest.
- Workers will not enter weedy fields.
PISTACHIOS: Glyphosate Use

Acre Treatments

GLYPHOSATE

Total Acres

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Price ($/Acre)</th>
</tr>
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<tbody>
<tr>
<td>Oxyfluorfen</td>
<td>14</td>
</tr>
<tr>
<td>Oryzalin</td>
<td>22</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>2</td>
</tr>
</tbody>
</table>
PISTACHIOS: Navel Orangeworm Insecticide Use

Acre Treatments vs. Total Acres

- Blue line: Insecticide Use
- Pink line: Total Acres


Acre Treatments range from 0 to 350,000
Total Acres range from 0 to 350,000
PISTACHIOS: Navel Orangeworm Insecticide Use

Acre Treatments

- CARBARYL

PISTACHIOS: Navel Orangeworm Insecticide Use

Acre Treatments


AZINPHOS-METHYL
CARBARYL
PHOSMET
PISTACHIOS: Navel Orangeworm Insecticide Use

Acre Treatments


AZINPHOS-METHYL
CARBARYL
METHOXYPENOXIDE
PHOSMET
SPINOSAD
PISTACHIOS: Navel Orangeworm Insecticide Use

Acre Treatments

AZINPHOS-METHYL
CARBARYL
METHOXYFENOZIDE
PERMETHRIN
PHOSMET
SPINOSAD

Celery: Pink Rot

Yield decline of 10-15% without soil treatment.
Bacterial Blight of Celery

This disease organism infects only celery.
Celery: Late Blight

500 million spores can be produced on a single celery plant.
CELERY: Fungicide Use, Late Blight

Acre Treatments

- ANILAZINE
- BENOMYL
- CHLOROTHALONIL
- THIOPHANATE-METHYL
- Total Acres

Year:
Lettuce Downy Mildew

Plant resistance to Downy Mildew broke down in the early 1990’s.
LETTUCE, HEAD: Fungicides, Downy Mildew

The graph shows the acre treatments for different fungicides across years. The treatments include:

- **COPPER**
- **FOSETYL-AL**
- **MANEB**
- **METALAXYL**
- **Total Acres**

The x-axis represents the years from 1990 to 2006, and the y-axis represents the acre treatments ranging from 0 to 350,000. The data shows variations in the use of these fungicides over the years.
LETTUCE, HEAD: Fungicides, Downy Mildew

Acre Treatments

- COPPER
- CYMOXANIL/ FAMOXADONE
- DIMETHOMORPH
- FOSETYL-AL
- MANEB
- MEFENOXAM
- METALAXYL
- FENAMIDONE
- ACIBENZOLAR
- Total Acres

Total Acres (1990-2006)
Lettuce Drop

Disease incidence can be as high as 70% in some fields.
STRAWBERRY: Fumigant Use

Acre Treatments

1,3-D
CHLOROPICRIN
METAM-SODIUM
METHYL BROMIDE
Total Acres

Strawberries: Gray Mold (Botrytis Fruit Rot)

The fungus infests 100% of strawberry acreage.
WALNUTS: Growth Regulator Use

Acre Treatments


($20/Treatment)
Walnuts: Growth Regulator Use

- Ethephon application advances harvest by 10-14 days.
- Early harvest avoids the need for final insecticide spray.
- Early harvest improves the quality of walnuts.
Kiwi: Growth Regulator Use

- 50% of the 1996 crop went unharvested due to small size.
- Research demonstrated that hydrogen cyanamide produces a uniform crop with larger sizes.
DATES: Miticide Use

Acre Treatments

HEXYTHIAZOX

SULFUR

Total Acres

- HEXYTHIAZOX
- SULFUR
- Total Acres
California Pesticide Trends Factors 1990-2006

- Public Policy
  - Section 18’s
  - FQPA
  - Water Quality Protection
  - Methyl Bromide Phaseout
  - OP Replacement Policy
  - Biopesticide Registrations
  - Non-Chemical Control Research
California Pesticide Trends Factors 1990-2006

- Industry Developments
  - Generics
  - Product Price Changes
  - New Active Ingredients
  - Biotech Crops

- Nature
  - New Pests
  - Weather Changes
  - Pest Resistance

- Crop Prices
Q: Has pesticide use increased or decreased in California?
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A: Yes.