

# **Pesticides & Their History: What They Mean For Bees**

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By Bryan Castro

# Who Am I?

California State University Channel Islands for Ecology - Primarily Pollination Ecology

Worked in CSUCI Entomology and Pollination Ecology Labs

Started Bryan's Bees 2012 with Five (Four?) Colonies

Worked as a Pest Control Advisor Assistant for Avocados and Citrus

Commercial Beekeeping with Jubilee Honey Co. in CA and ID (5000 Hives)

Worked in residential pest control in CA, ID and WA



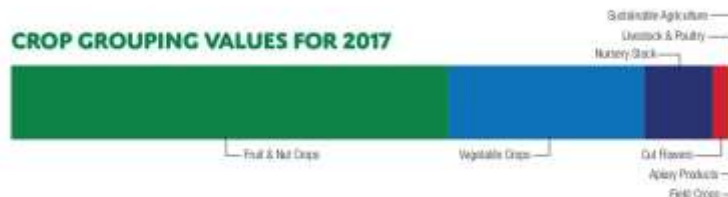
## Recapitulation & Index 2016-2017

CROP GROUPING	YEAR	VALUE <sup>1</sup>
■ 1. Fruit & Nut Crops	2017	\$1,270,397,000
	2016	\$1,286,534,000
■ 2. Vegetable Crops	2017	\$569,471,000
	2016	\$556,675,000
■ 3. Nursery Stock	2017	\$197,969,000
	2016	\$206,840,000
■ 4. Cut Flowers	2017	\$49,904,000
	2016	\$48,042,000
■ 5. Livestock & Poultry	2017	\$4,578,000
	2016	\$5,707,000
■ 6. Apiary Products	2017	\$3,746,000
	2016	\$2,796,000
■ 7. Sustainable Agriculture	2017	\$2,272,000
	2016	\$2,018,000
■ 8. Field Crops	2017	\$1,552,000
	2016	\$1,585,000
<b>GRAND TOTAL<sup>2</sup></b>	2017	<b>\$2,099,890,000</b>
	2016	<b>\$2,110,187,000</b>

<sup>1</sup> Figures are rounded off to nearest \$1,000

<sup>2</sup> Ventura County has approximately 35,850 acres of irrigated cropland. Our total farmed acreage is 293,549 (74% 690 acres are farmland).

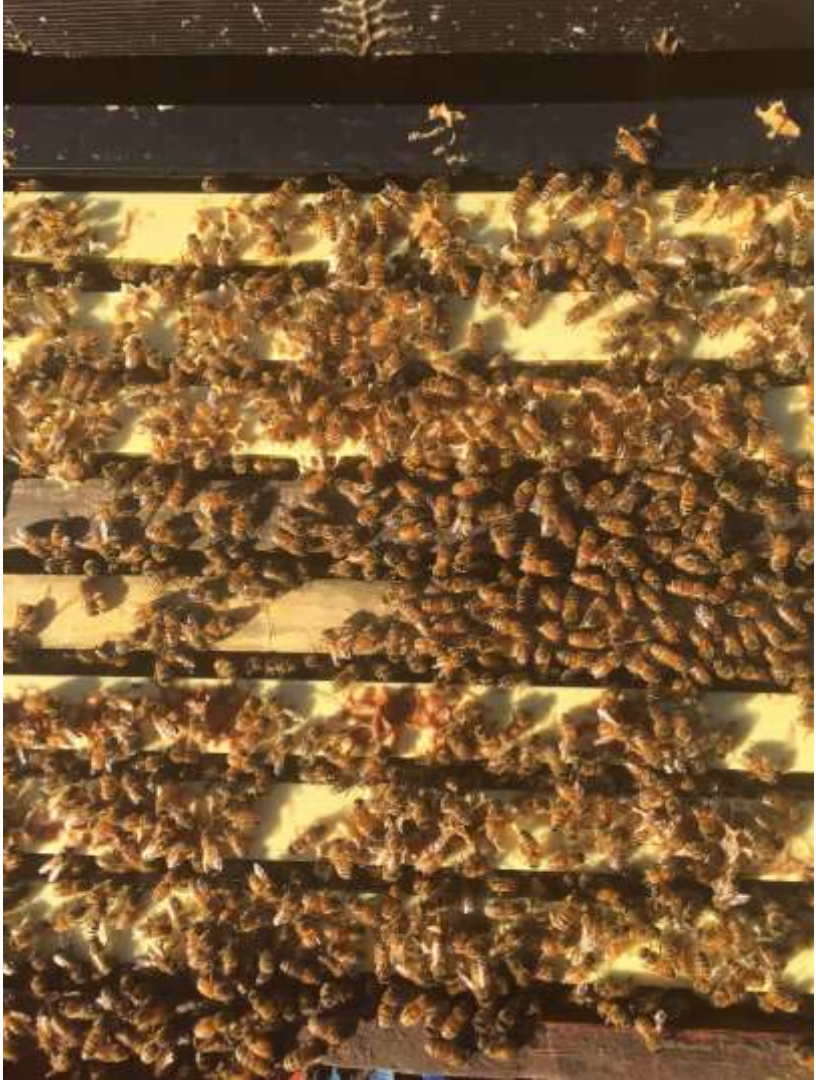
### CROP GROUPING VALUES FOR 2017











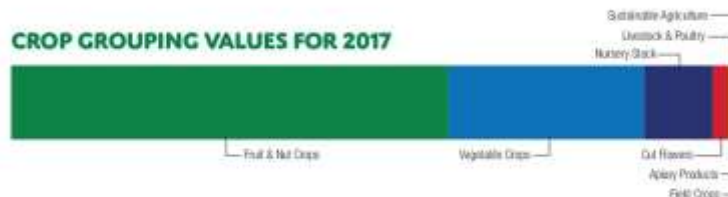
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<sup>2</sup> Ventura County has approximately 35,850 acres of irrigated cropland. Our total farmed acreage is 293,549 (747,699 acres are non-farmed).

### CROP GROUPING VALUES FOR 2017





# Crops with Highest Insecticide Use

1	Apples
2	Peaches
3	Nectarines
4	Strawberries
5	Grapes
6	Celery
7	Spinach
8	Bell Peppers
9	Cucumbers
10	Cherry Tomatoes
11	Snap Peas
12	Potatoes

# History of Insecticides

## Organic Pesticides

Very simple organic compounds like sulfur

**Pre 1940**



**1940**

**Organochloride, Organophosphate,  
Carbamate**

First Acute Kill Pesticides

## Pyrethroid

Acute kill pesticide to replace DDT

**1950**



**1990**

**Neonicotinoid**

First Major Systemic Pesticide

# Half Life and Toxicity

The amount of time it takes for 50% of a chemical to decompose

Organophosphates - VERY toxic with VERY short half life (sometimes 3 hours)

Pyrethroids - Toxic with half life of 8-18 days

Neonicotinoid 8-1000 days. 35 days around average. Low toxicity.











# Problems With Pesticides

Improper Mixing

Lack of Notification

Bloom in Orchards

## **What if the application isn't an insecticide?**

Hymenoptera (Bees Ants and Wasps) don't like ANY icides.

Round Up has been found to impact bees

Fungicides on raspberries has caused crop failures

Fertilizers can impact bee productivity



# What Makes Systemic Pesticides Bad For Bees?

The same things that make them good for everything else!

Long half life

Spread through entire plant

Can be found in pollen

Doesn't seem to cause an acute kill

Causes sublethal impacts on bees such as disorientation

# My CCD Hypothesis

Bees get confused and unable to find their way home.

Queen Lays Her weight in eggs DAILY! She is the most vulnerable!

Once the colony collapses the neighbors rob the tainted honey.

Exposure increases vulnerability to varroa.

# Problems with Current System

Notification system is flawed

No protection for beekeepers unless there is an acute kill with proof

Applicators only get in trouble in cases of extreme negligence

# What Makes Pesticides Dangerous and How Do We Keep Bees Safe?

Risk of Exposure and Level of Toxicity

Use oils or acute pesticides

Night Applications

Don't apply during bloom OR if bloom will occur during duration of insecticide

Alert beekeepers so we can move the bees

Restrict use of long lasting insecticides