MA615 Group6 Midterm Project

PDF

Violet Chen, Jacob Chen, James He

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Introduction

Our group were interested in investigating the effects of pesticides that used on strawberry. In order t

The first step was to gather enough background knowledge. From the Agricultural Marketing Resource Cente

Secondly, we searched about the effects of bees on strawberry production and came to the results that be

At last, we did some background research on pesticides and found out the fungicides and insecticides are

Based on the information we had, we proposed a question: What's the change of bee-harmed pesticides usag

We planed to first wrangle the data to get what we want: we would discard "D"s and NAs in the columns to

Data Wrangle

```
##   Program Year Period Week.Ending Geo.Level      State State.ANSI Ag.District
## 1  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
## 2  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
## 3  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
## 4  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
## 5  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
## 6  CENSUS 2019   YEAR          NA     STATE CALIFORNIA          6          NA
##   Ag.District.Code County County.ANSI Zip.Code Region watershed_code Watershed
## 1               NA     NA          NA       NA     NA              0        NA
## 2               NA     NA          NA       NA     NA              0        NA
## 3               NA     NA          NA       NA     NA              0        NA
## 4               NA     NA          NA       NA     NA              0        NA
## 5               NA     NA          NA       NA     NA              0        NA
## 6               NA     NA          NA       NA     NA              0        NA
##      Commodity                                                  Data.Item
## 1 STRAWBERRIES                STRAWBERRIES, ORGANIC - OPERATIONS WITH SALES
## 2 STRAWBERRIES                 STRAWBERRIES, ORGANIC - SALES, MEASURED IN $
## 3 STRAWBERRIES               STRAWBERRIES, ORGANIC - SALES, MEASURED IN CWT
## 4 STRAWBERRIES  STRAWBERRIES, ORGANIC, FRESH MARKET - OPERATIONS WITH SALES
## 5 STRAWBERRIES   STRAWBERRIES, ORGANIC, FRESH MARKET - SALES, MEASURED IN $
## 6 STRAWBERRIES STRAWBERRIES, ORGANIC, FRESH MARKET - SALES, MEASURED IN CWT
##           Domain                      Domain.Category       Value CV....
## 1 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED)         174      8
```

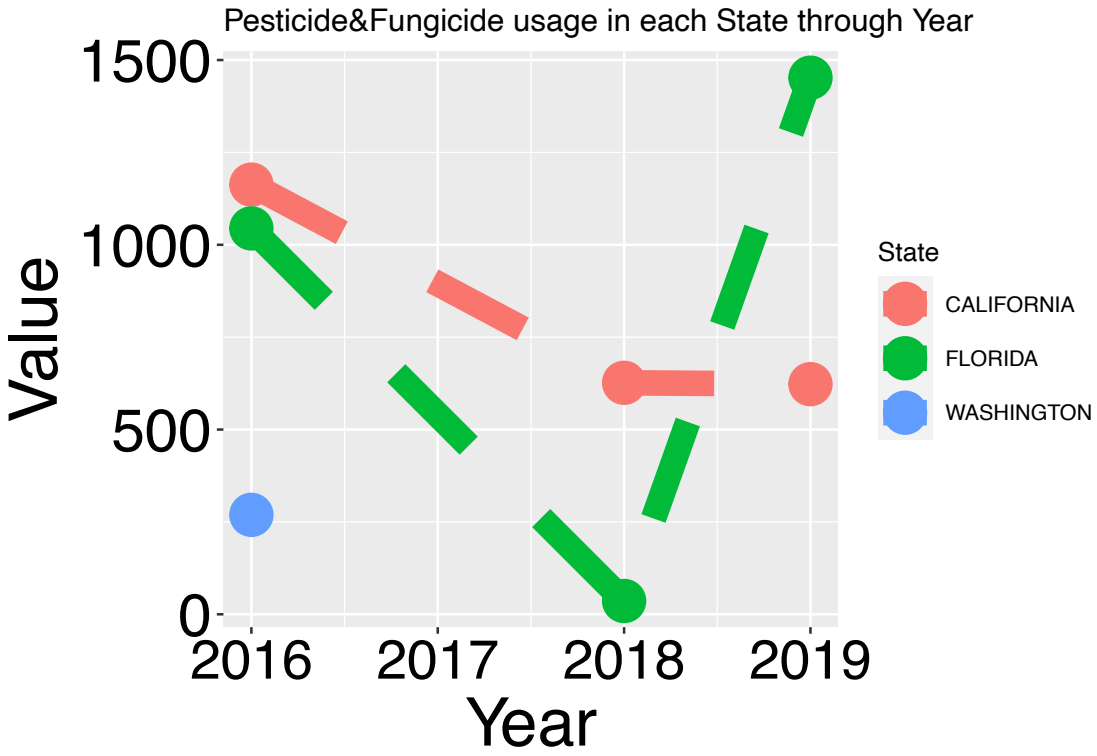
```
## 2 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED) 300,277,717   33.1
## 3 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED)   1,384,016   30.4
## 4 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED)         170      8
## 5 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED) 275,716,713   35.5
## 6 ORGANIC STATUS ORGANIC STATUS: (NOP USDA CERTIFIED)   1,177,214   33.7
```

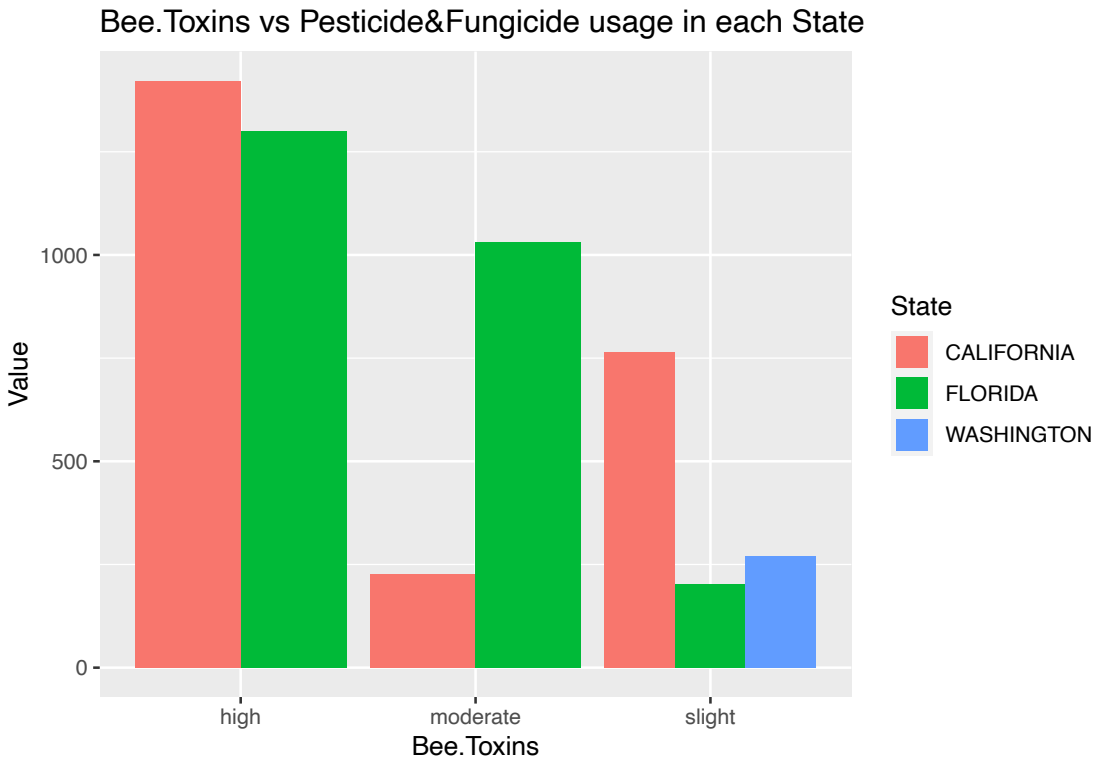
```
##                       Pesticide Carcinogen Hormone.Disruptor Neurotoxins
## 1
## 2 Tetrahydrophthalimide (THPI)
## 3
## 4               Pyraclostrobin
## 5
## 6                      Captan      known
##   Developmental.or.Reproductive.Toxins Bee.Toxins
## 1
## 2
## 3
## 4                                          slight
## 5
## 6
```

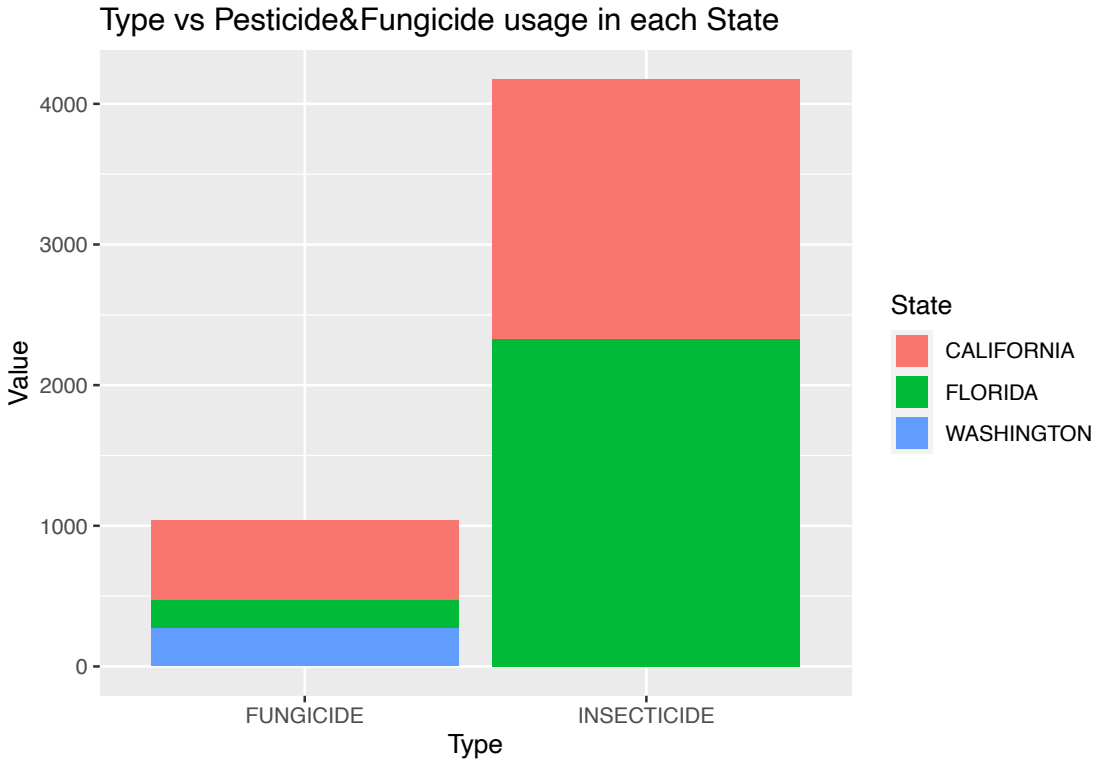
```
## [1] "C"
```

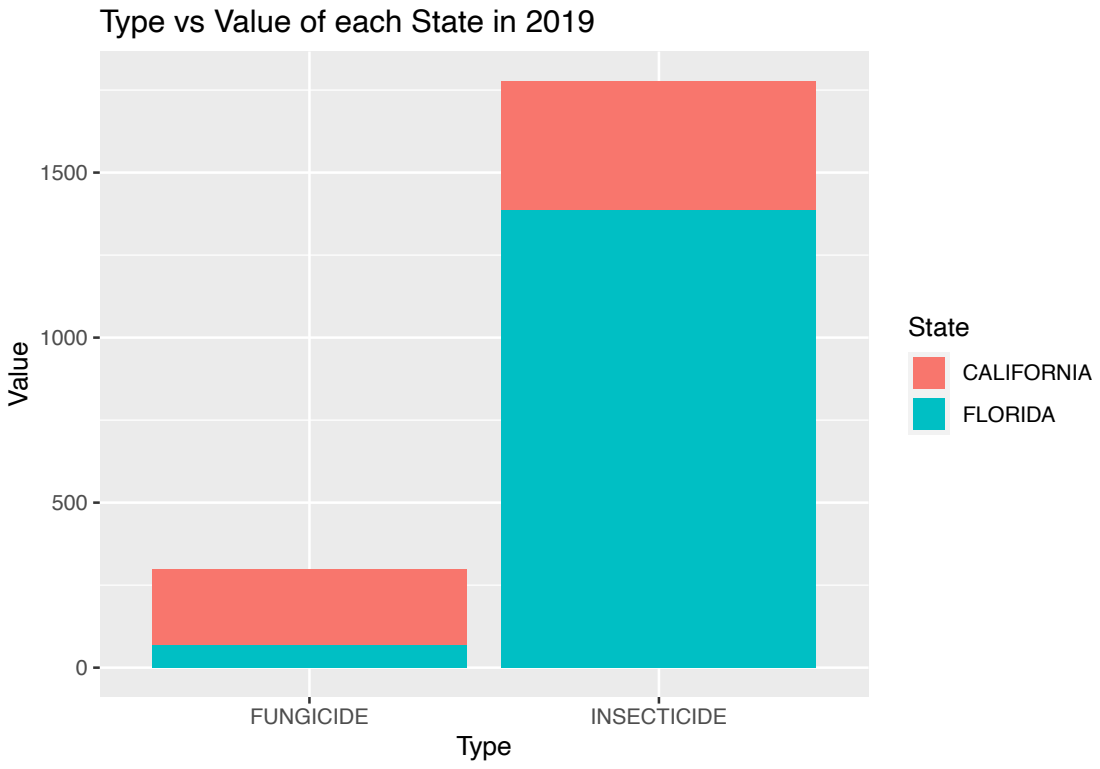
EDA

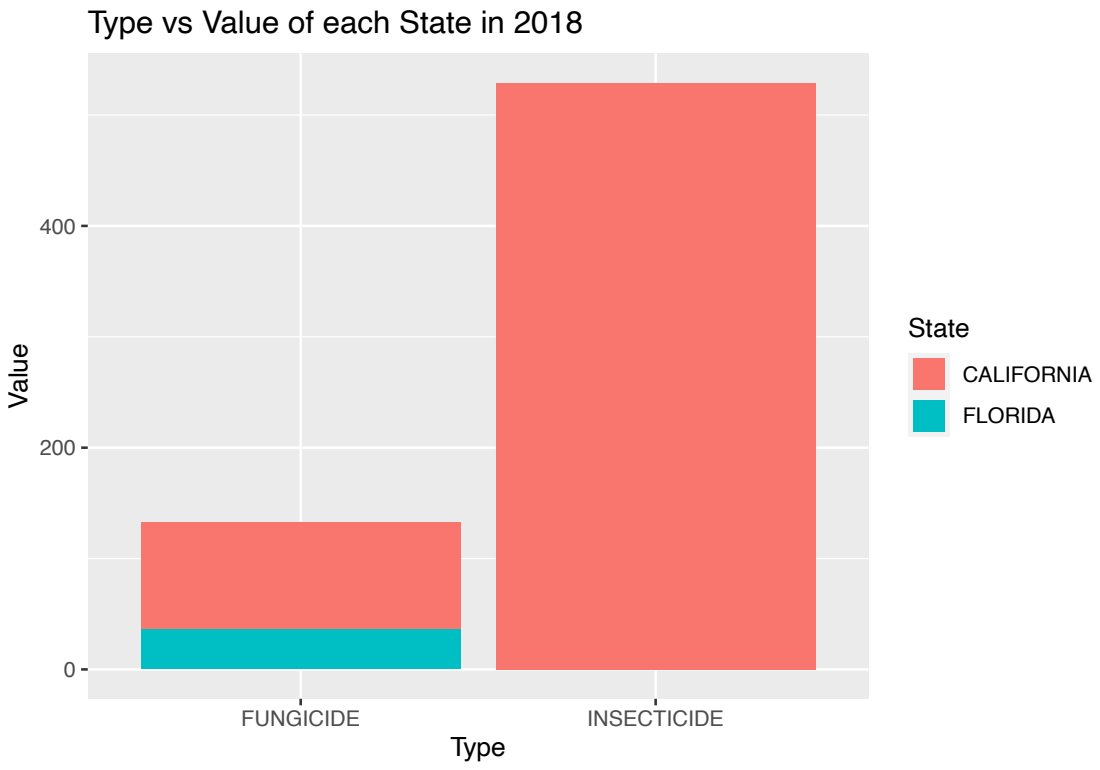
Using the individual-level

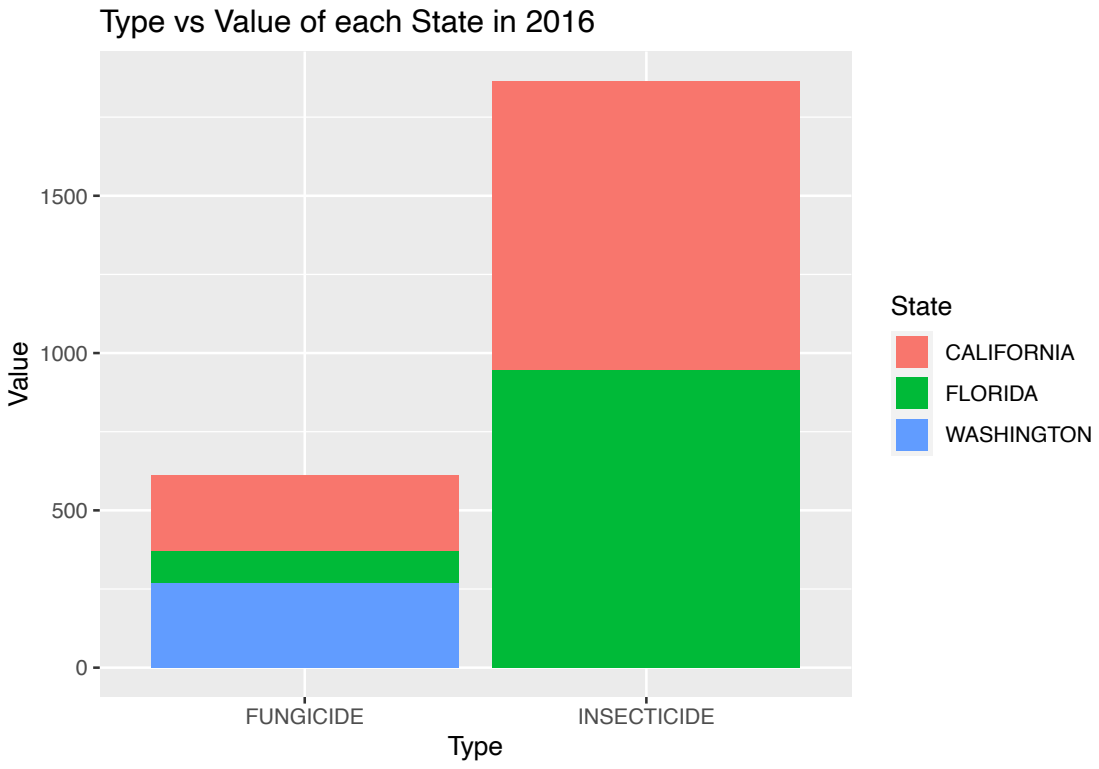


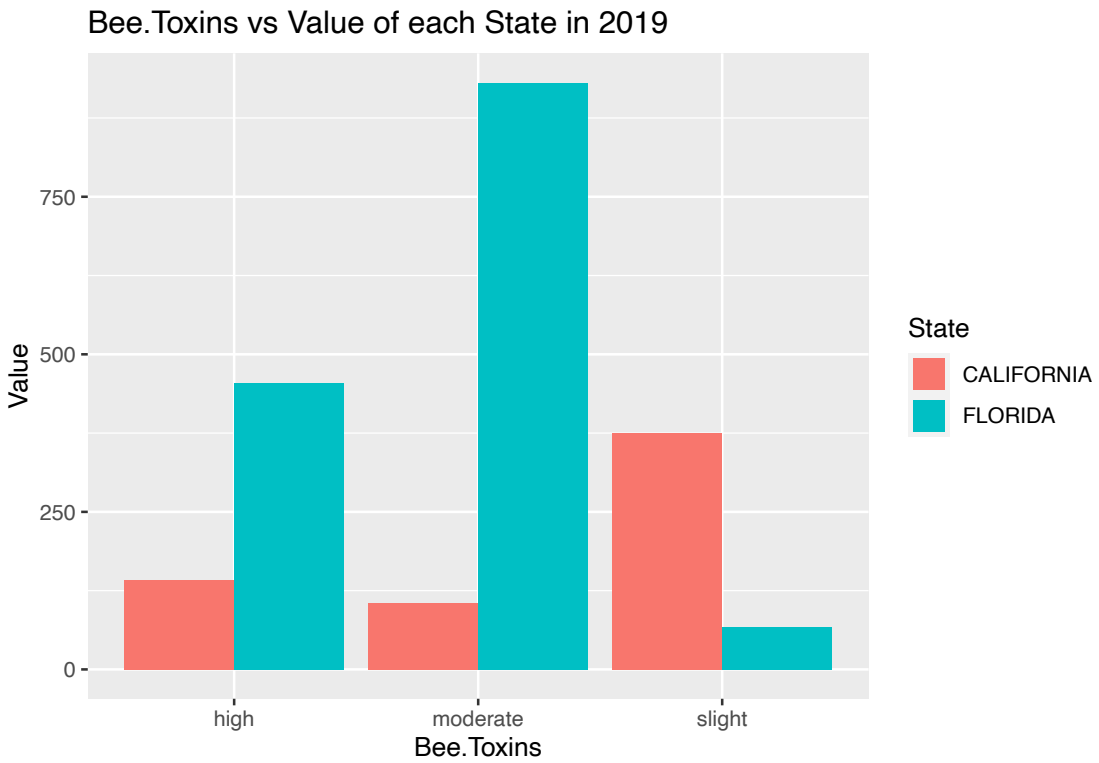

Bee.Toxins vs Pesticide&Fungicide usage in each State
Value
1000
500
0
high
moderate
slight
Bee.Toxins
State
CALIFORNIA
FLORIDA
WASHINGTON

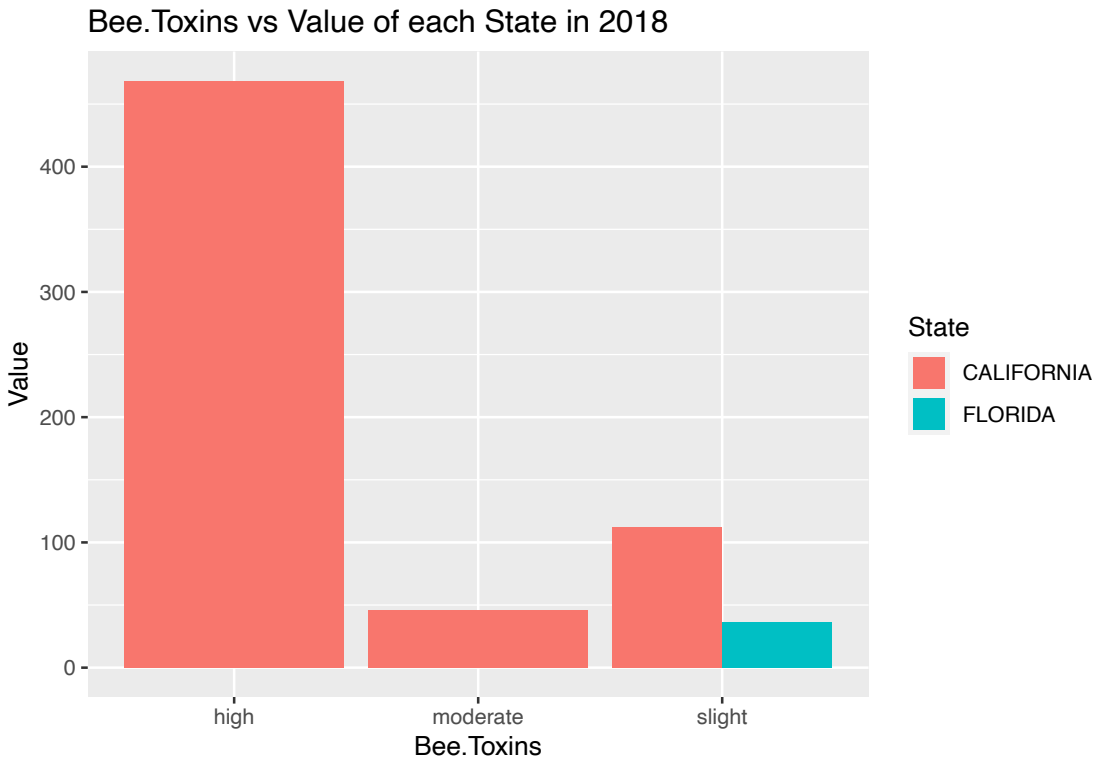

Type vs Pesticide&Fungicide usage in each State
Value
4000
3000
2000
1000
0
FUNGICIDE
INSECTICIDE
Type
State
CALIFORNIA
FLORIDA
WASHINGTON

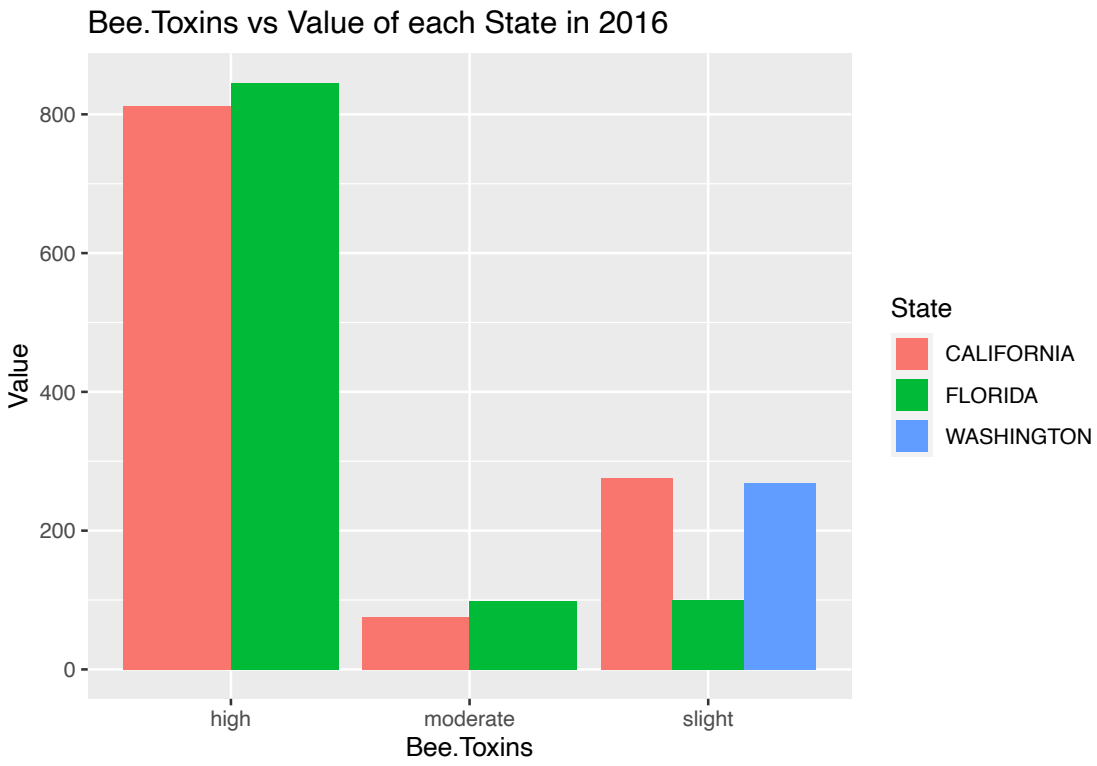

Type vs Value of each State in 2019
1500
1000
500
0
Value
FUNGICIDE
INSECTICIDE
Type
State
CALIFORNIA
FLORIDA

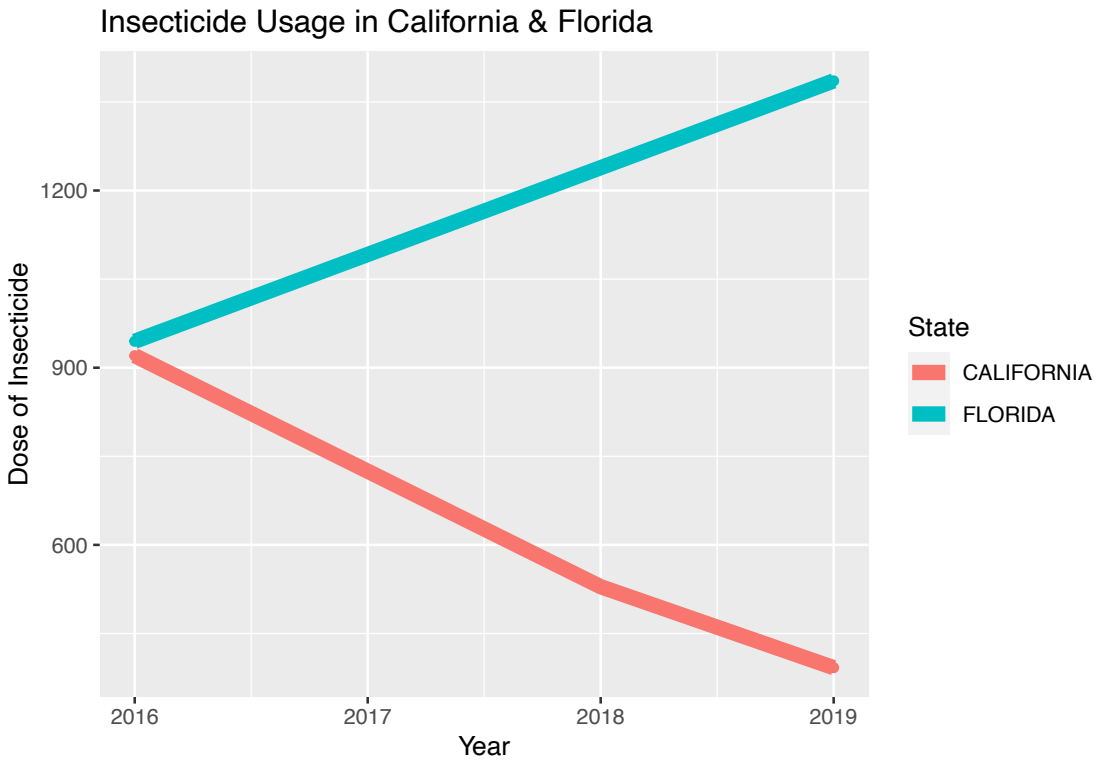

Type vs Value of each State in 2018
400
200
0
Value
FUNGICIDE
INSECTICIDE
Type
State
CALIFORNIA
FLORIDA

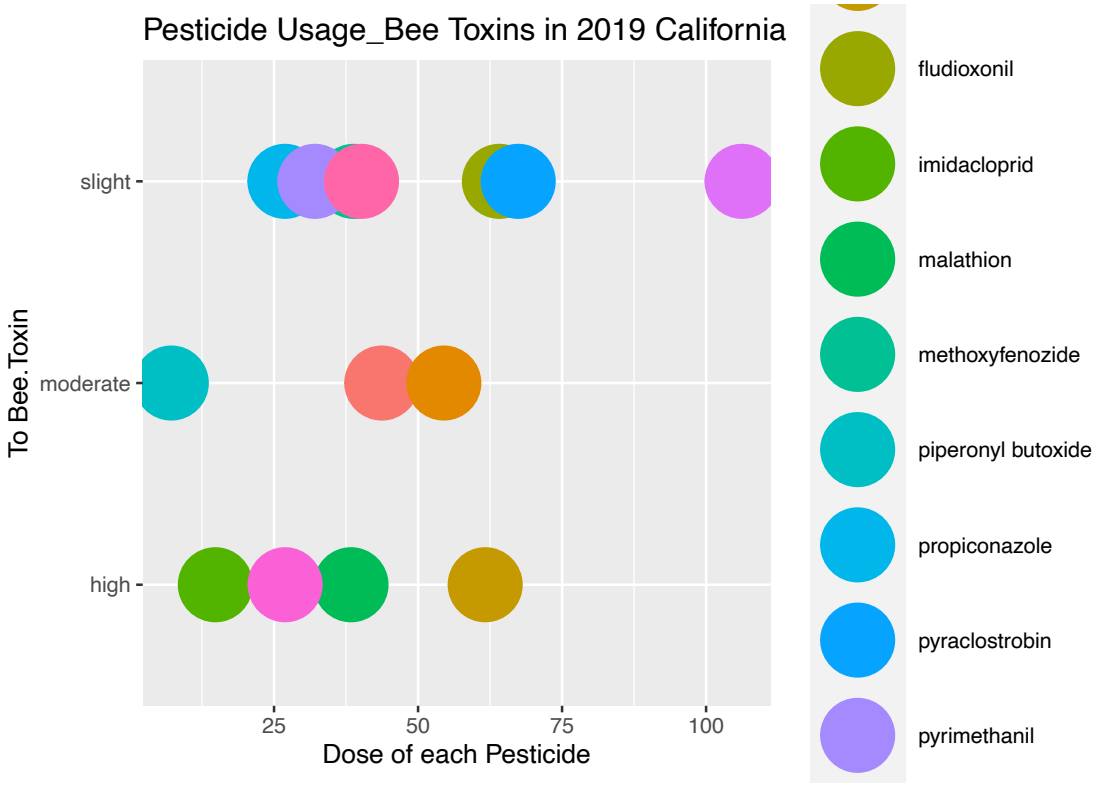

Type vs Value of each State in 2016
1500
1000
500
0
Value
FUNGICIDE
INSECTICIDE
Type
State
CALIFORNIA
FLORIDA
WASHINGTON

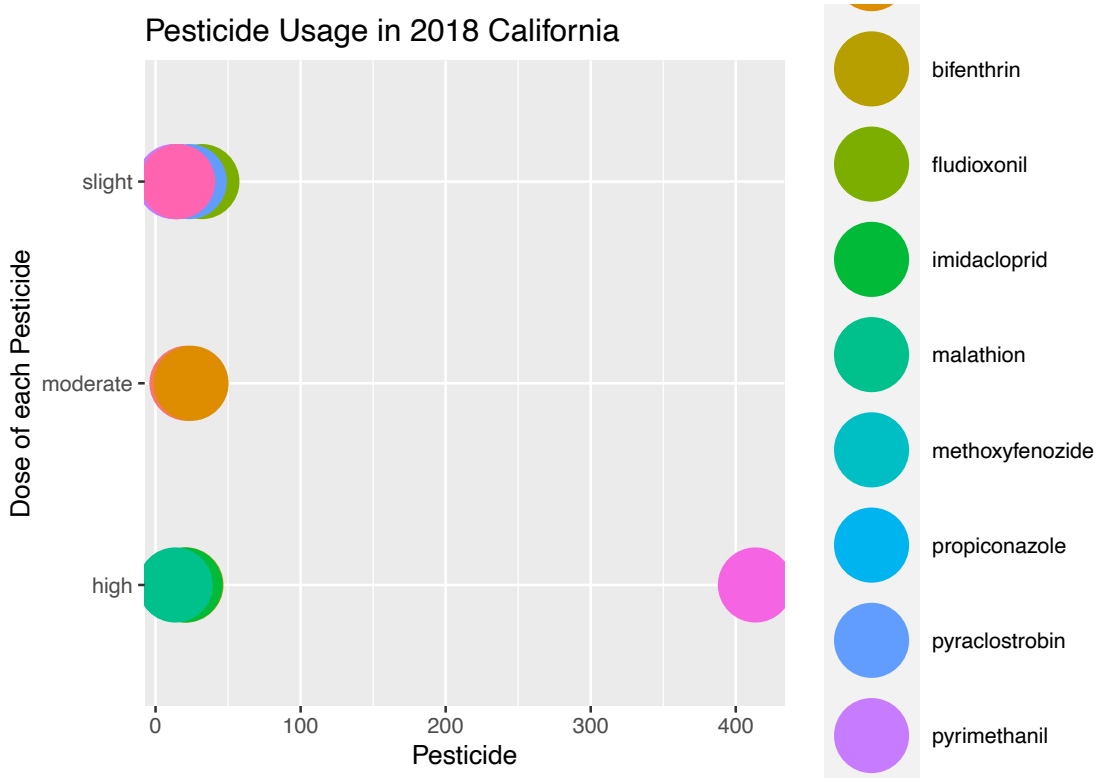

Bee.Toxins vs Value of each State in 2019
750
500
250
0
Value
high
moderate
slight
Bee.Toxins
State
CALIFORNIA
FLORIDA

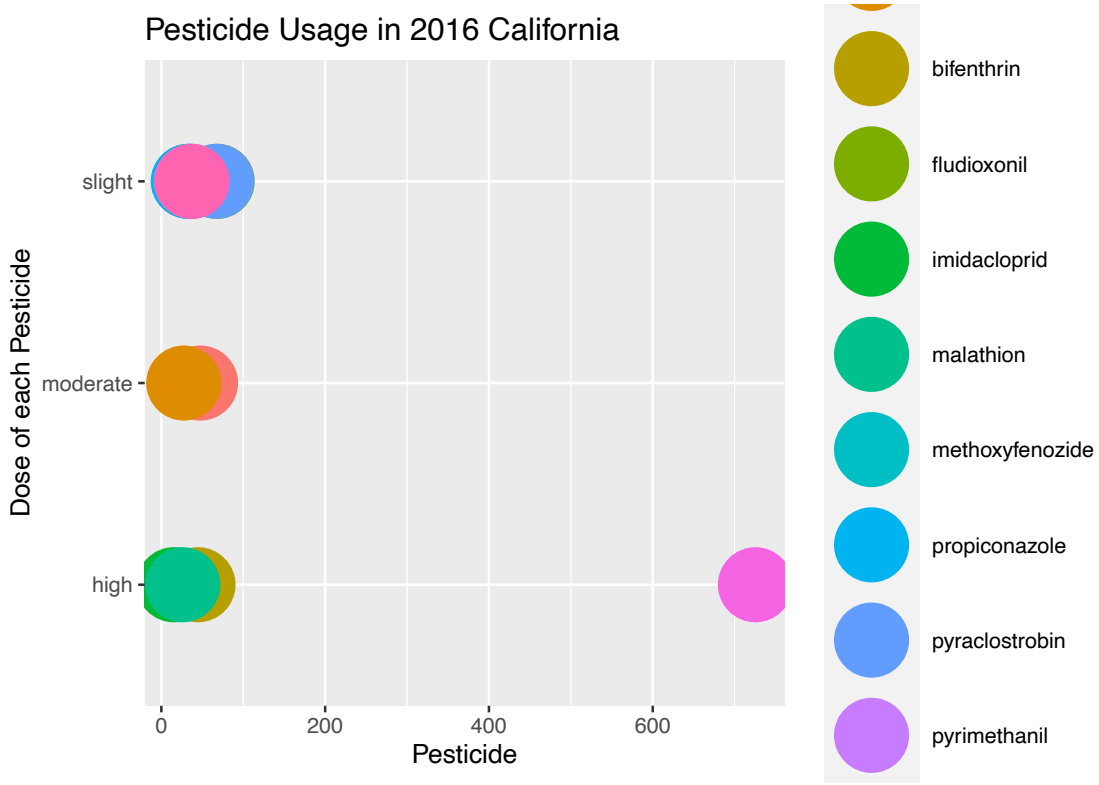

Bee.Toxins vs Value of each State in 2018
Value
400
300
200
100
0
high
moderate
slight
Bee.Toxins
State
CALIFORNIA
FLORIDA

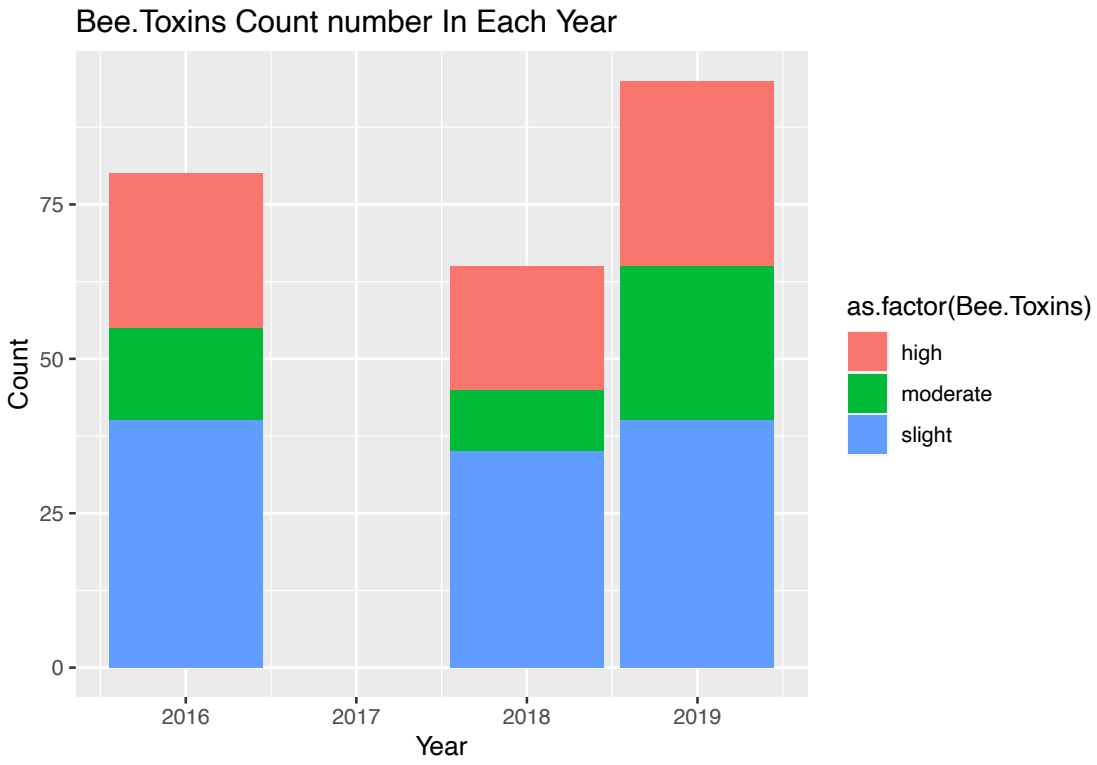

Bee.Toxins vs Value of each State in 2016
Value
800
600
400
200
0
high
moderate
slight
Bee.Toxins
State
CALIFORNIA
FLORIDA
WASHINGTON


Insecticide Usage in California & Florida
Dose of Insecticide
1200
900
600
2016
2017
2018
2019
Year
State
CALIFORNIA
FLORIDA


Pesticide Usage_Bee Toxins in 2019 California
To Bee.Toxin
slight
moderate
high
25
50
75
100
Dose of each Pesticide
fludioxonil
imidacloprid
malathion
methoxyfenozide
piperonyl butoxide
propiconazole
pyraclostrobin
pyrimethanil


Pesticide Usage in 2018 California
Dose of each Pesticide
slight
moderate
high
0
100
200
300
400
Pesticide
bifenthrin
fludioxonil
imidacloprid
malathion
methoxyfenozide
propiconazole
pyraclostrobin
pyrimethanil


Pesticide Usage in 2016 California
Dose of each Pesticide
slight
moderate
high
0
200
400
600
Pesticide
bifenthrin
fludioxonil
imidacloprid
malathion
methoxyfenozide
propiconazole
pyraclostrobin
pyrimethanil



Map

Results

After EDA analysis and map analysis, we came to several conclusions:

- The pesticides usage decreased in 2018 in all the states, and then bounced back in 2019.
- The types of pesticides used also decreased in 2018 in all states, and then bounced back in 2019; more bee-toxins pesticides were used in 2019 in both states.
- Florida's usage of pesticides surpassed the usage in California in 2019.

Discussion

Before our group discussed about the results, we first clarified the harmful effects of pesticides on bees. If governments did not choose to control the use of pesticides, 41% of the insects will distinct in the next few decades. The most harmful pesticides is the neonics which have far-reaching effects on bees, birds, and other animals. The pesticides, if leak into the underground water and soil, will have build-up effects on environment that may permanently damage corp production.

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After the initial research, we tried to find out why Florida surpassed California in the usage of pesti

Though US banned the usage for pesticides in 2019, America is still behind the world on pesticides regu

However, a total ban of pesticides may trigger opposing effects from pesticides companies. Governments
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- Limit the time window for the usage of pesticides, especially during flower blossom.
- Apply Integrated Pest Management plan that use cultural, mechanical, and biological pest controls together to reduce the usage of pesticides to minimum.
- Leave a buffer area between pesticides treated areas and where wildlife may be present. Take care when planting treated seeds to prevent dust with pesticides that could affect bees.

  In conclusion, we found that different states have different regulations on pesticides use and this will affect the usage in each states. However, US is generally behind the pesticides regulation of the world. Also, impose modest ways to control pesticides is better than a total ban of pesticides. At last, we hope that government and farmers can use less bee-harmful pesticides to protect natural pollinators.