

# MA615 Group6 Midterm Project

## PDF

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### Introduction

Our group were interested in investigating the effects of pesticides that used on strawberry. In order to do this, we first gathered background knowledge. The first step was to gather enough background knowledge. From the Agricultural Marketing Resource Center, we learned that strawberries are one of the most popular fruits in the United States. Secondly, we searched about the effects of bees on strawberry production and came to the results that bees are essential for the production of strawberries. At last, we did some background research on pesticides and found out the fungicides and insecticides are commonly used on strawberries. Based on the information we had, we proposed a question: What's the change of bee-harmed pesticides usage over time? We planed to first wrangle the data to get what we want: we would discard "D"s and NAs in the columns to be used.

### 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
```

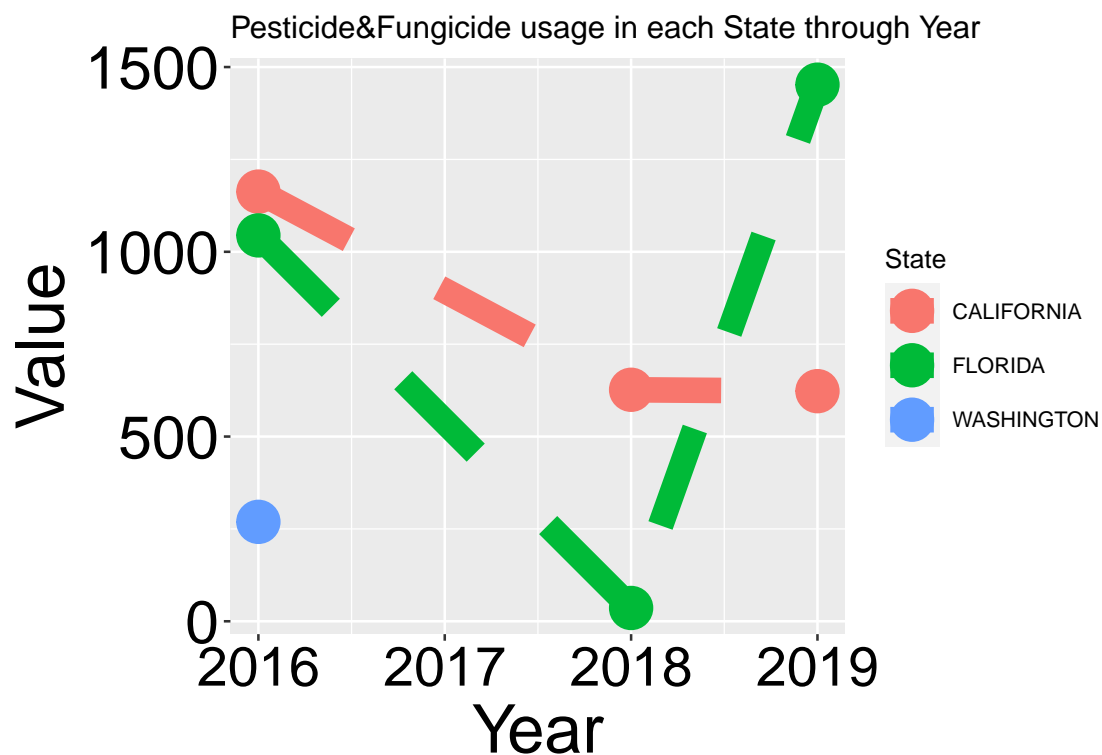
```
## Pesticide Carcinogen Hormone.Disruptor Neurotoxins
```

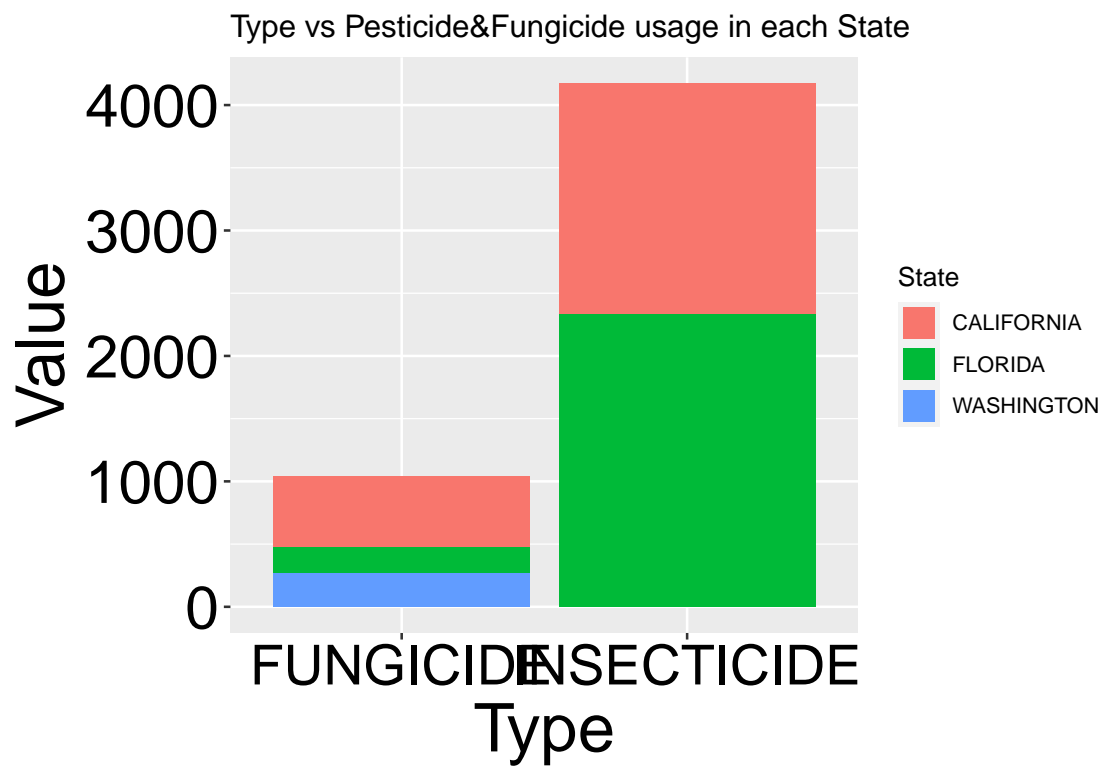
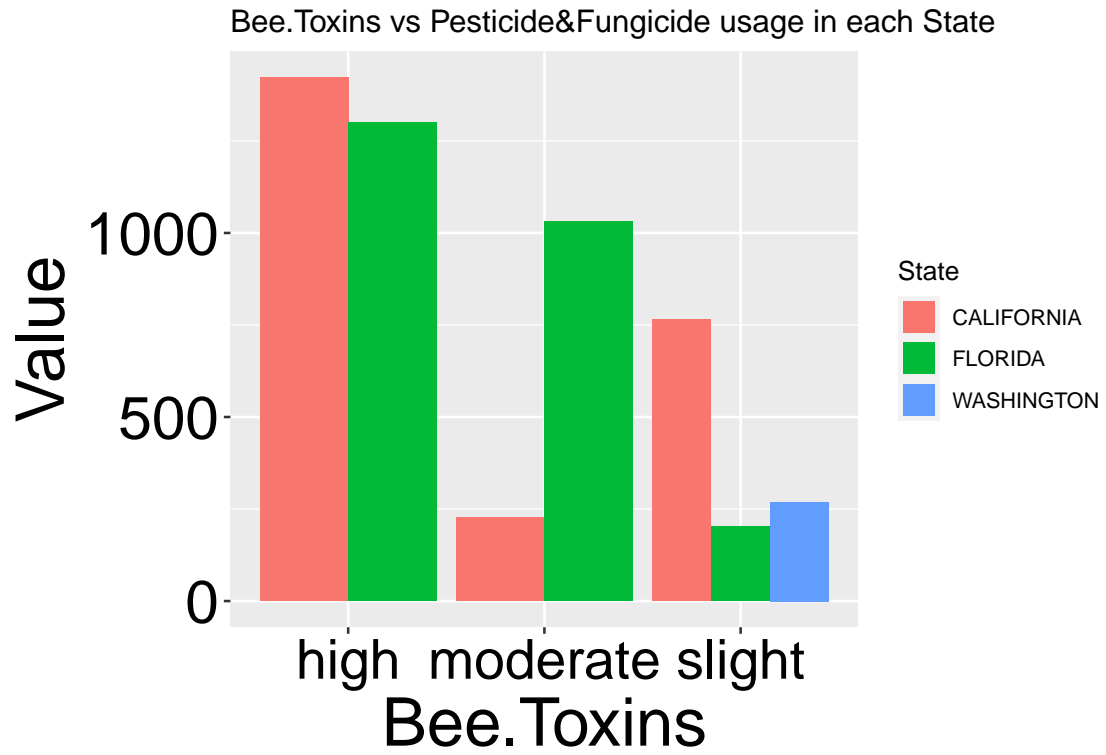
```
## 1
## 2 Tetrahydrophthalimide (THPI)
## 3
## 4 Pyraclostrobin
## 5
## 6 Captan known
## Developmental.or.Reproductive.Toxins Bee.Toxins
## 1
## 2
## 3
## 4 slight
## 5
## 6
```

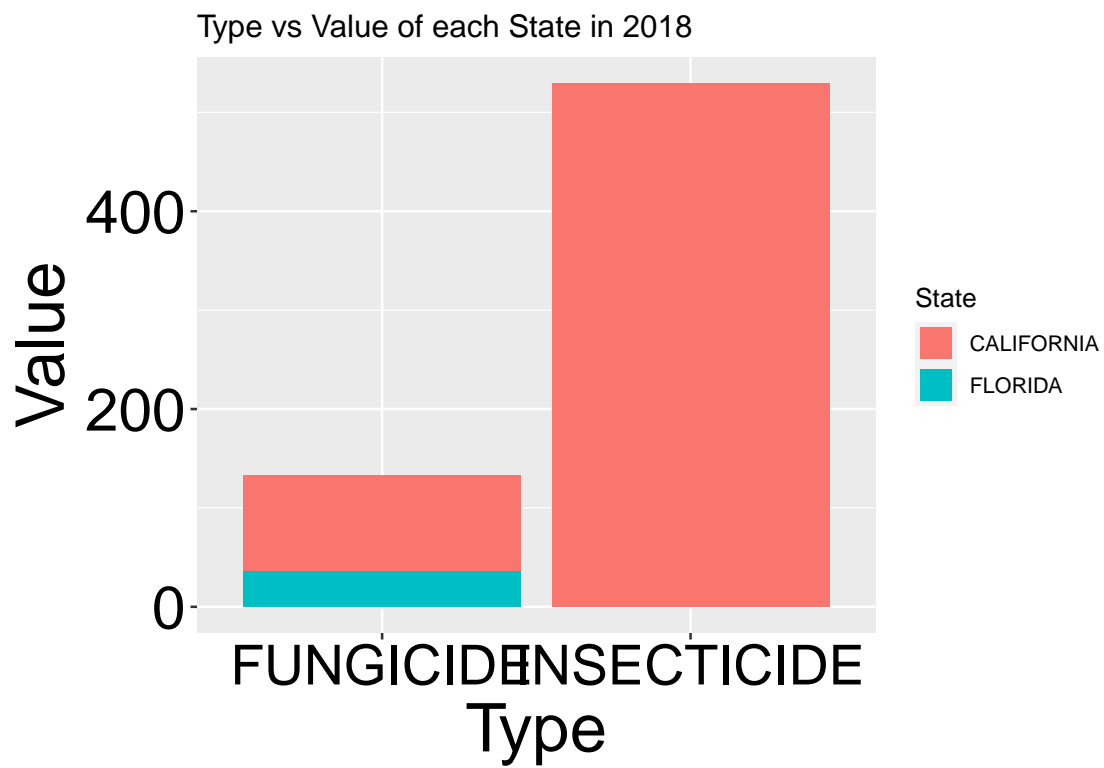
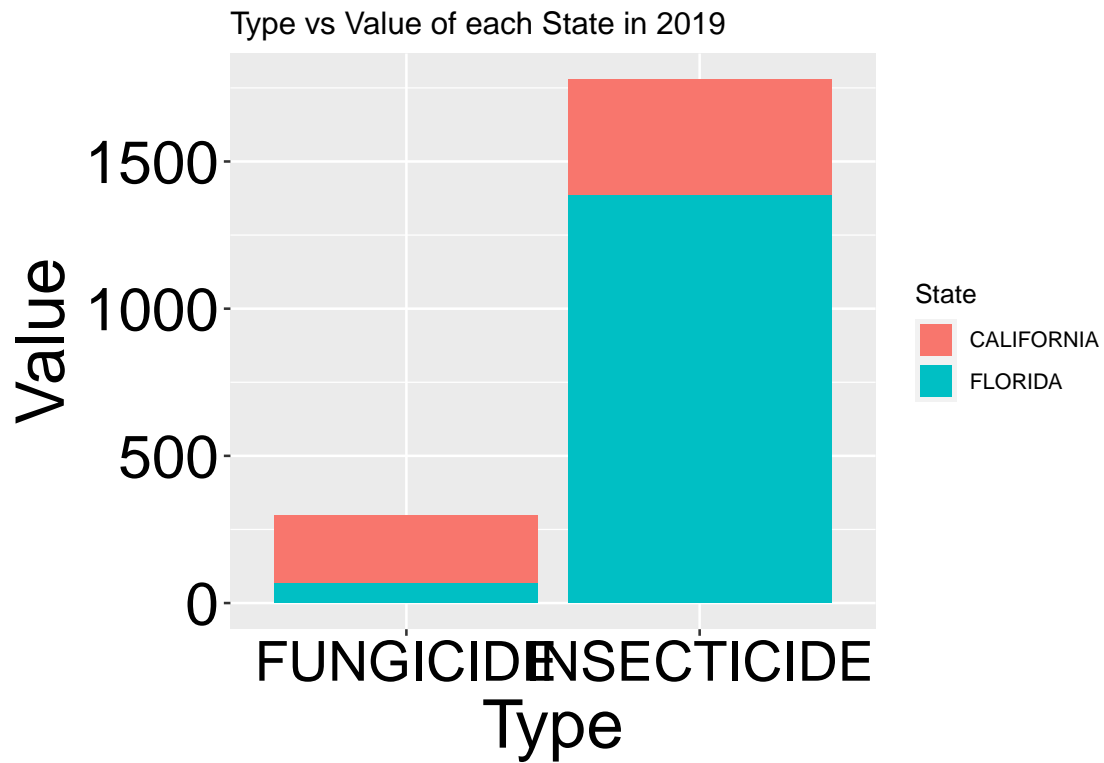
```
## [1] "C"
```

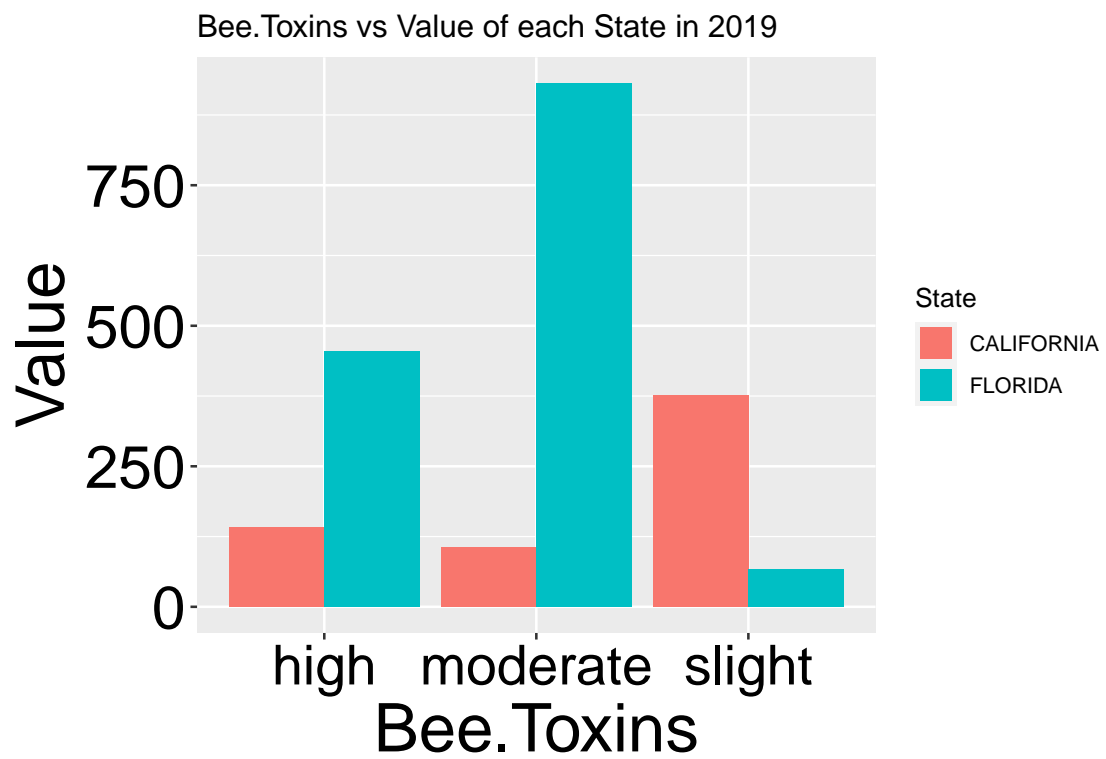
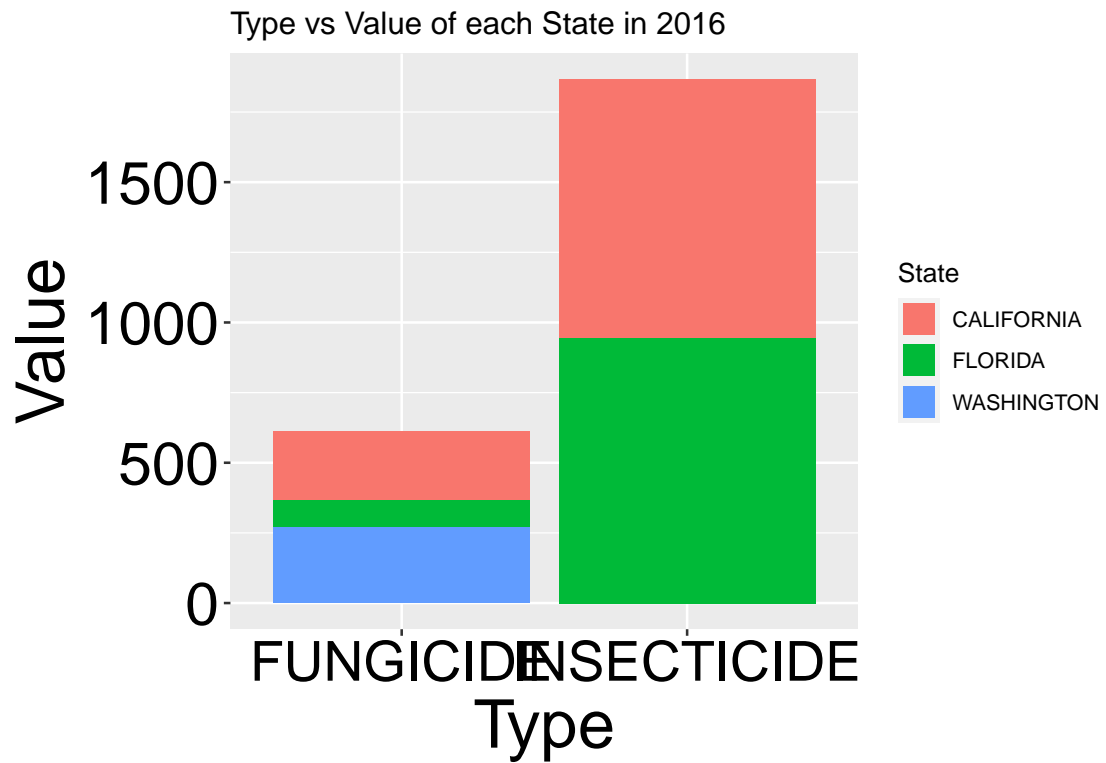
## EDA

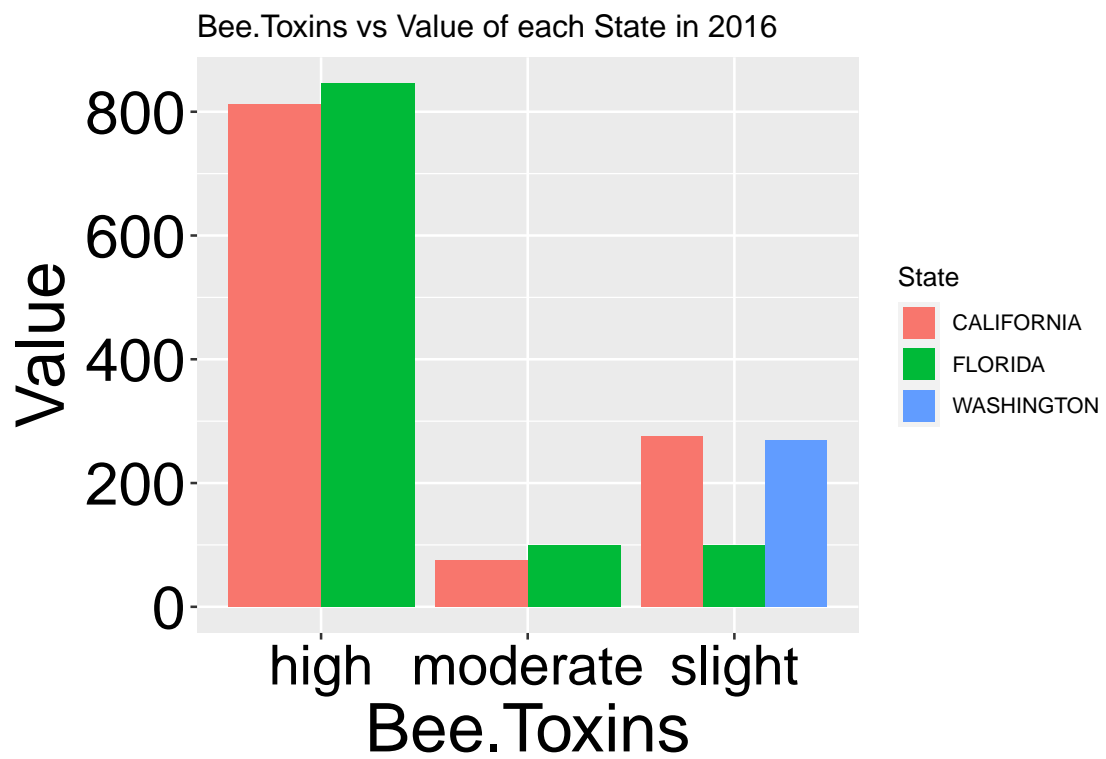
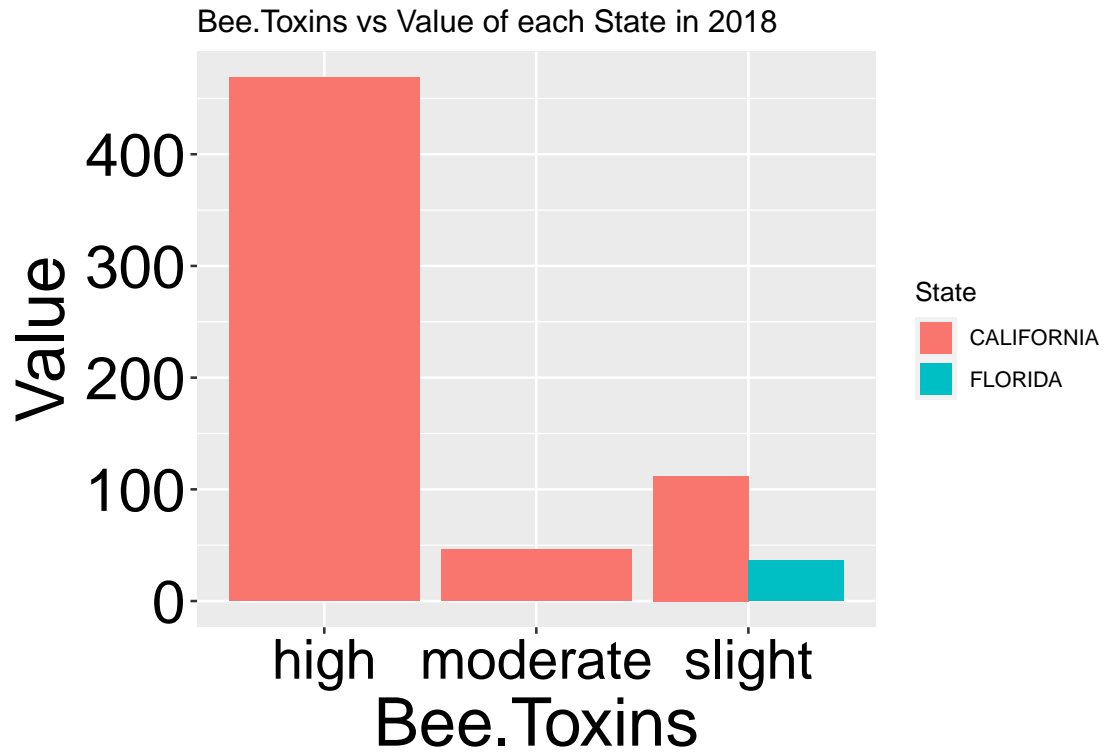
Using the individual-level

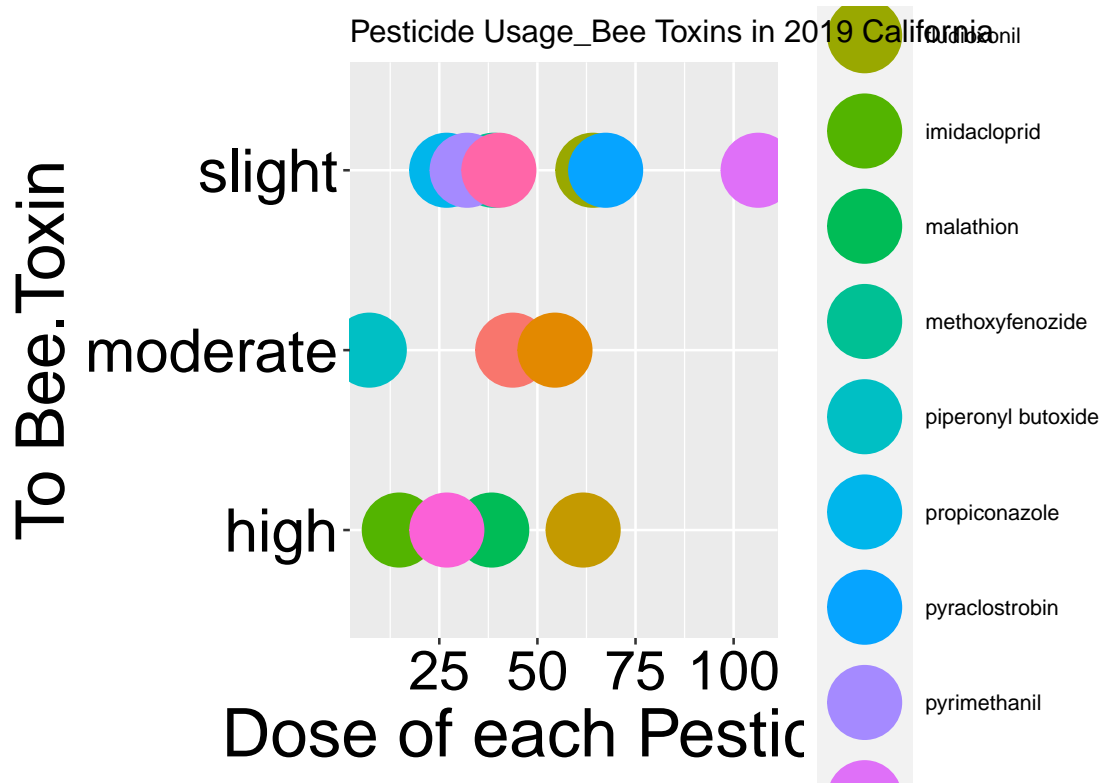
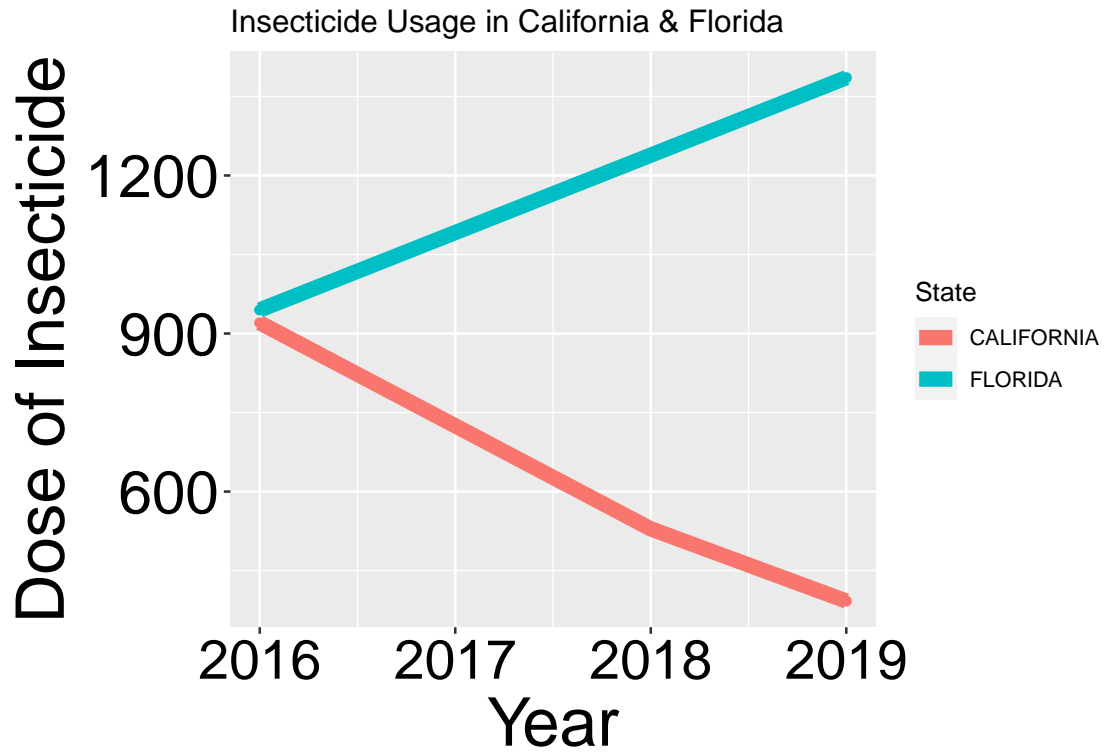


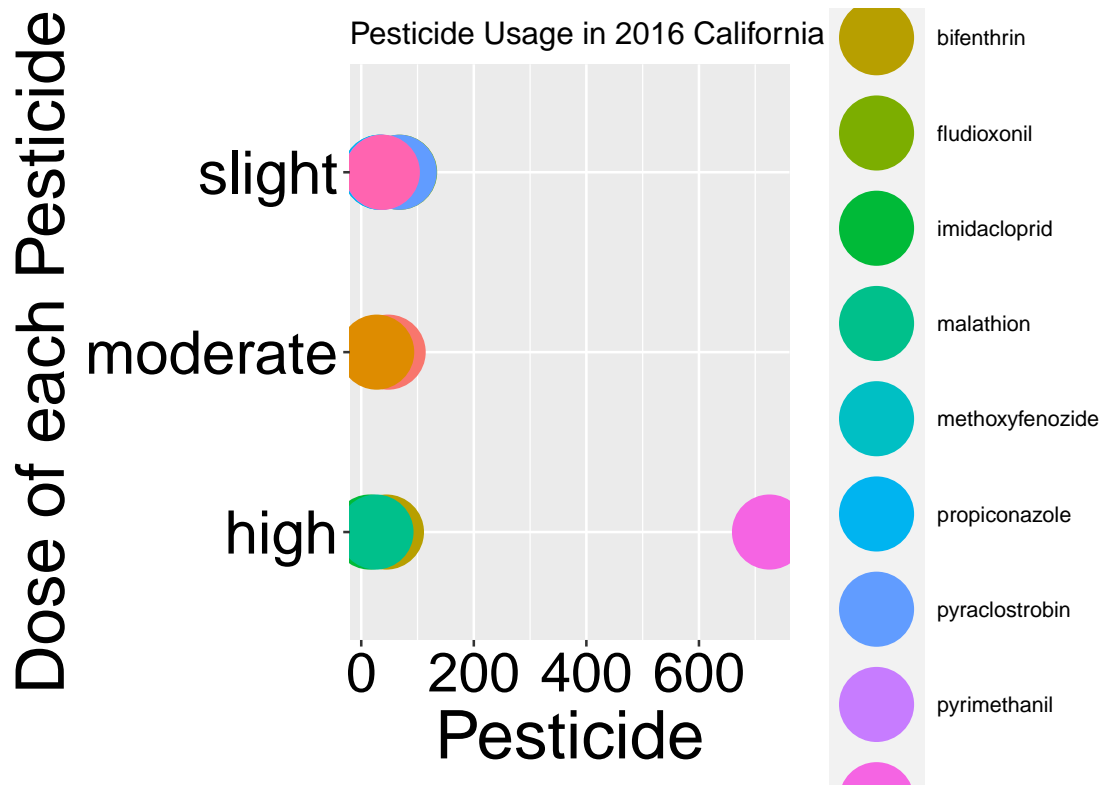
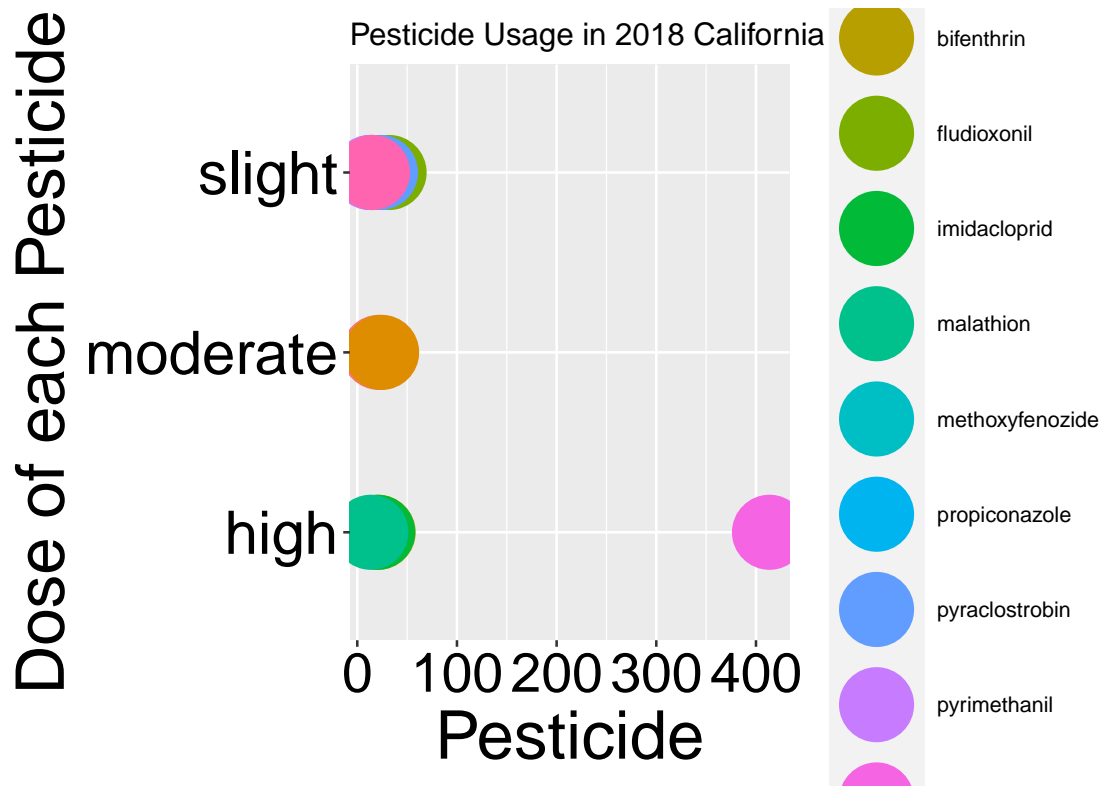




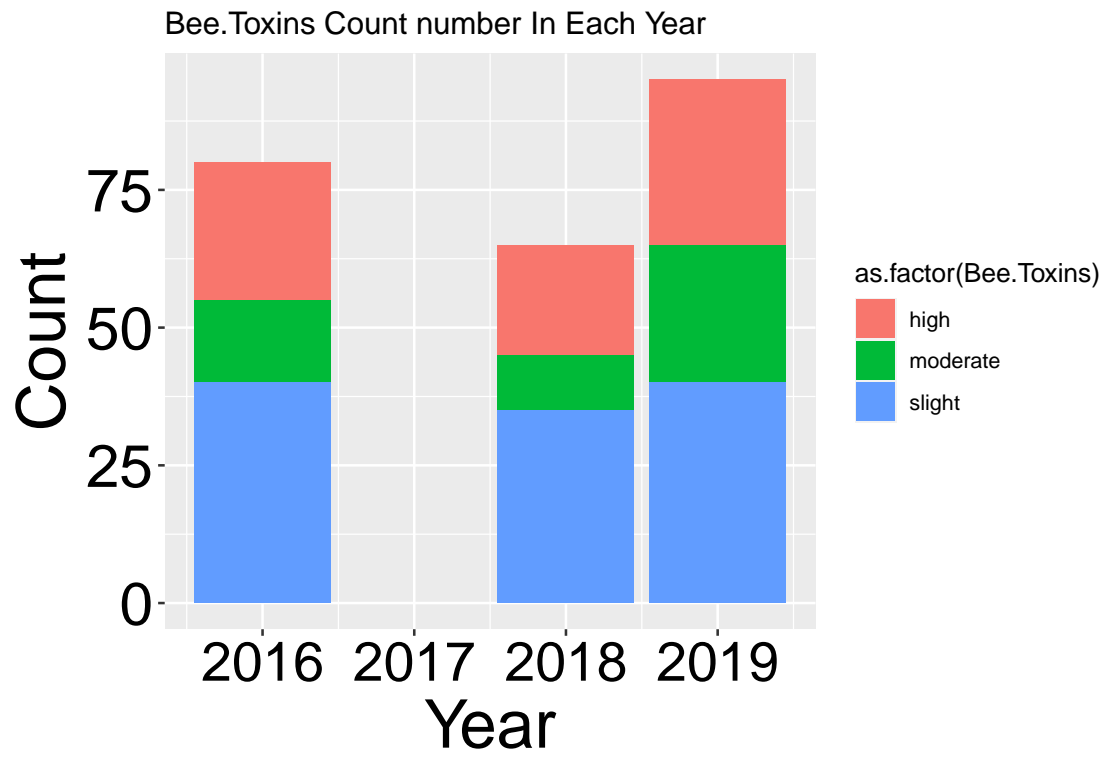




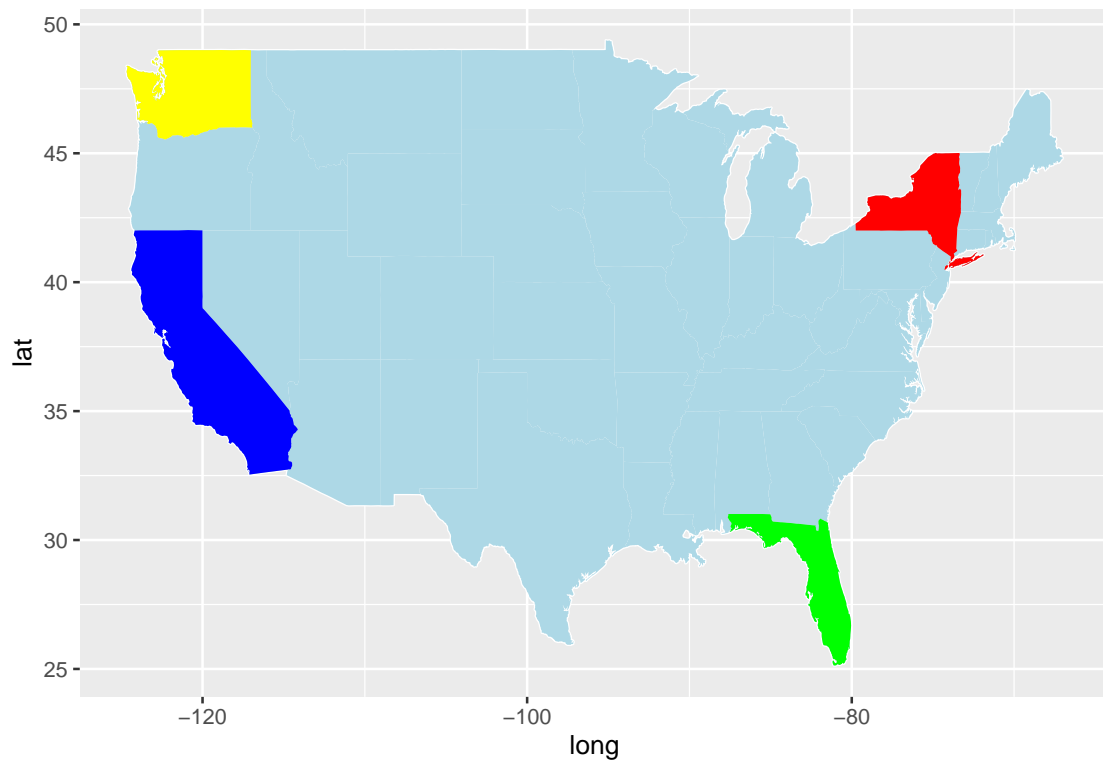








Map



## 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 crop production.

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

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

However, a total ban of pesticides may trigger opposing effects from pesticides companies. Governments should consider the following:

- 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.

CITATION: 1. Proportion of strawberry production in 2017: <https://www.agmrc.org/commodities-products/fruits/strawberries>

2.Pesticide use: <https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles>