615_Assignment3_Honey

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October 3, 2018

```
#Loading data files
Honey <- read_csv("Honey.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_character(),
##   Year = col_integer(),
##   `State ANSI` = col_integer(),
##   watershed_code = col_integer(),
##   Value = col_number()
## )
```

```
## See spec(...) for full column specifications.
```

```
Deadout <- read_csv("Deadout.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_character(),
##   Year = col_integer(),
##   `State ANSI` = col_integer(),
##   watershed_code = col_integer(),
##   Value = col_number()
## )
## See spec(...) for full column specifications.
```

```
Price_per_lb <- read_csv("Price per lb.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_character(),
##   Year = col_integer(),
##   `State ANSI` = col_integer(),
##   watershed_code = col_integer(),
##   Value = col_double()
## )
## See spec(...) for full column specifications.
```

```
Production_per_Colony <- read_csv("Production per Colony.csv")
```

```
## Parsed with column specification:
## cols(
##   .default = col_character(),
##   Year = col_integer(),
##   `State ANSI` = col_integer(),
##   watershed_code = col_integer(),
##   Value = col_double()
## )
## See spec(...) for full column specifications.
```

```
Honey_value_annual <- read_csv('Honey_value.csv')
```

```
## Parsed with column specification:
## cols(
##   .default = col_character(),
##   Year = col_integer(),
##   Value = col_double()
## )
## See spec(...) for full column specifications.
```

```
CPI <- read_csv('1987_2017CPI.csv')
```

```
## Parsed with column specification:
## cols(
##   Year = col_integer(),
##   CPI = col_double()
## )
```

```
honey_loss_dt <- read.csv('Honey_Loss_6_States.csv')
```

```
#sort each data set to variables we want.
Honey <- dplyr::select(Honey,Year,State,Value)
Deadout <- dplyr::select(Deadout,Year,Period,State,Value)
Price_per_lb <- dplyr::select(Price_per_lb,Year,State,Value)
Production_per_Colony <- dplyr::select(Production_per_Colony,Year,State,Value)
Honey_value_annual <- dplyr::select(Honey_value_annual,Year,Value)



#Filter out totals, group each variable by state, average values from each year
Production <- filter(Honey, State != "US TOTAL") %>% group_by(State) %>% summarise(Average_production =
Loss <- filter(Deadout, State != "US TOTAL") %>% group_by(State) %>% summarise(Average_loss = mean(Valu
Price <- filter(Price_per_lb, State != "US TOTAL") %>% group_by(State) %>% summarise(Average_price = mea
Colony_production <- filter(Production_per_Colony, State != "US TOTAL") %>% group_by(State) %>% summaris

#Combine into one set. Add new variables to show number of colonies and loss/colony
Honey_by_State <- full_join(Production, Loss, by = "State")
Honey_by_State <- full_join(Honey_by_State, Price, by = "State")
Honey_by_State <- full_join(Honey_by_State, Colony_production, by = "State") %>%
  mutate(Colonies = Average_production*2000/Average_per_colony) %>%
  mutate(Loss_per_colony = Average_loss/Colonies)

# pick 6 top states with highest production and complete data
Honey_State <- Honey %>%  group_by(State)
unique(Honey$State)
```

```
##  [1] "US TOTAL"       "ALABAMA"        "ARIZONA"        "ARKANSAS"
##  [5] "CALIFORNIA"     "COLORADO"       "FLORIDA"        "GEORGIA"
##  [9] "HAWAII"         "IDAHO"          "ILLINOIS"       "INDIANA"
## [13] "IOWA"           "KANSAS"         "KENTUCKY"       "LOUISIANA"
## [17] "MAINE"          "MICHIGAN"       "MINNESOTA"      "MISSISSIPPI"
## [21] "MISSOURI"       "MONTANA"        "NEBRASKA"       "NEW JERSEY"
## [25] "NEW YORK"       "NORTH CAROLINA" "NORTH DAKOTA"   "OHIO"
## [29] "OREGON"         "OTHER STATES"   "PENNSYLVANIA"   "SOUTH CAROLINA"
## [33] "SOUTH DAKOTA"   "TENNESSEE"      "TEXAS"          "UTAH"
```

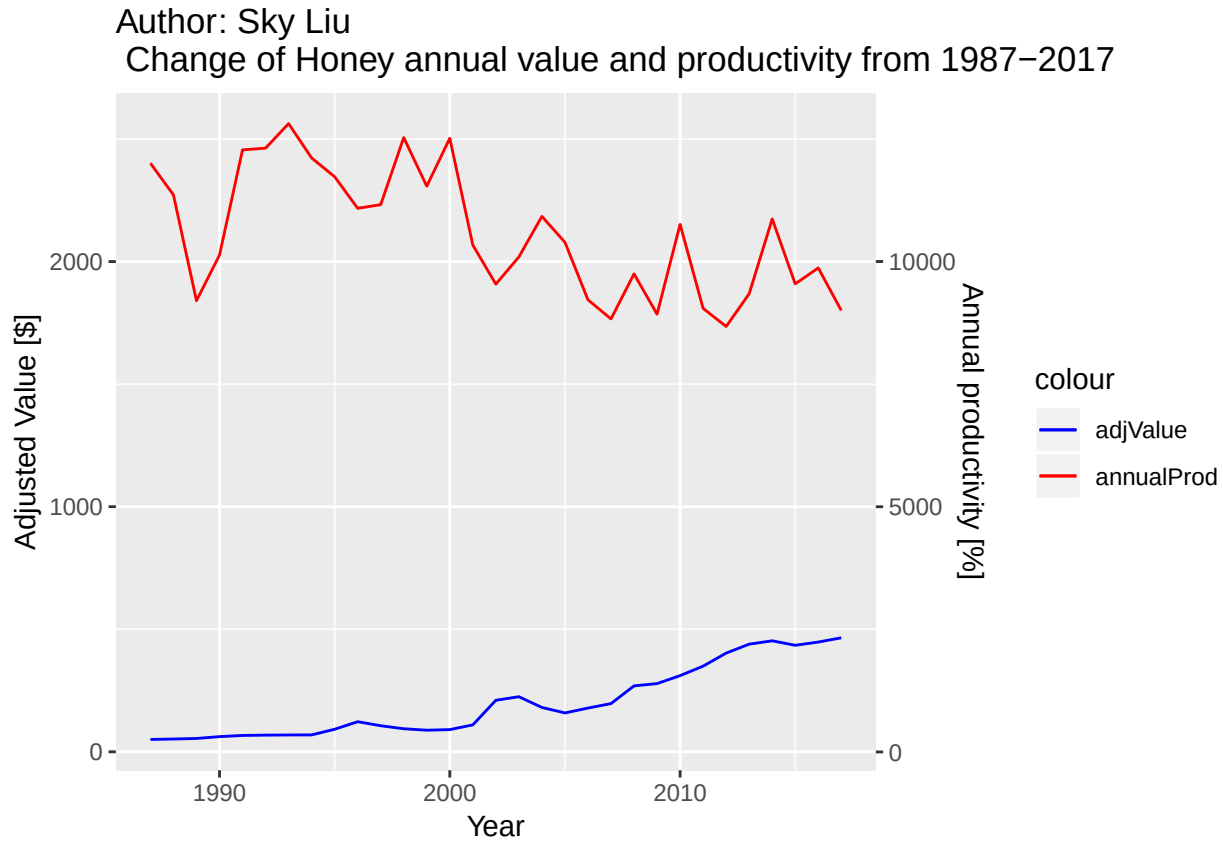
```
## [37] "VERMONT"        "VIRGINIA"       "WASHINGTON"     "WEST VIRGINIA"
## [41] "WISCONSIN"      "WYOMING"        "NEW MEXICO"     "NEVADA"
## [45] "MARYLAND"       "OKLAHOMA"       "CONNECTICUT"    "DELAWARE"
## [49] "MASSACHUSETTS"  "NEW HAMPSHIRE"  "RHODE ISLAND"
```

```
Honey_sixstate <- Honey_State %>%
  filter(State %in% c("CALIFORNIA", "FLORIDA" ,"SOUTH DAKOTA", "NORTH DAKOTA","MONTANA", "MINNESOTA")) %
  arrange(State, Year)

#Honey lost in 6 states
#Sum by year (Since we only have the data in 1st and 2nd quarter in 2018, we will exclude the data in 2
honey_loss_dt$Value <- as.numeric(gsub(",","",honey_loss_dt$Value))
honey_2017 <- honey_loss_dt %>% select(Year,State,Value) %>% filter(Year==2017) %>% group_by(Year,State)
honey_2016 <- honey_loss_dt %>% select(Year,State,Value) %>% filter(Year==2016) %>% group_by(Year,State)
honey_2015 <- honey_loss_dt %>% select(Year,State,Value) %>% filter(Year==2015) %>% group_by(Year,State)
# Total loss from 2015-2017
honey_total <- rbind(honey_2017,honey_2016,honey_2015)


#Adjust the annual honey value (price received) by 1987 inflation rate.
baseCPI <- rep(113.6, 21)
adjusted_Price <- as.data.frame(Honey_value_annual$Value * (CPI$CPI / baseCPI))
```

```
## Warning in CPI$CPI/baseCPI: longer object length is not a multiple of
## shorter object length
```

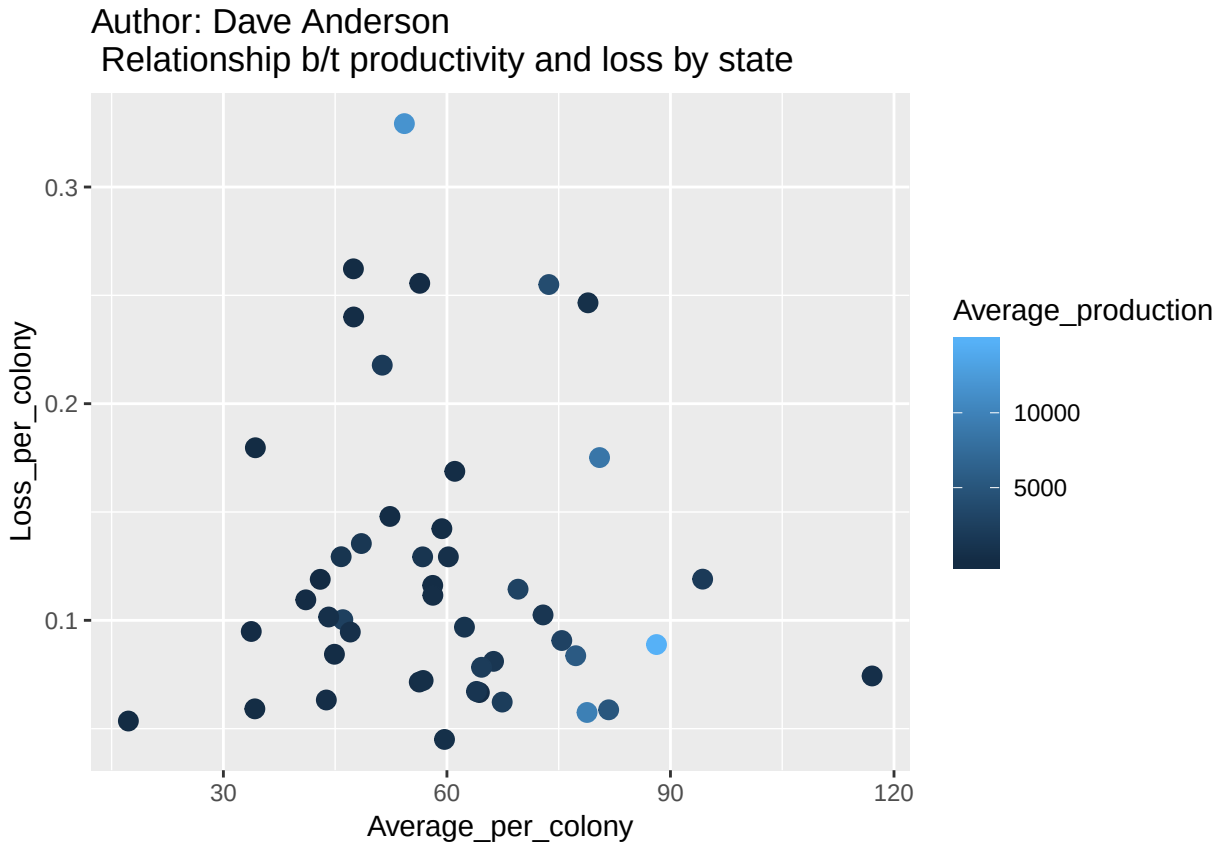
```
Honey_value_annual <- cbind(Honey_value_annual,adjusted_Price)
names(Honey_value_annual) <- c('Year','Value','adjValue')
#Add annual productivity
Annual_production <- filter(Honey, State != "US TOTAL") %>% group_by(Year)  %>% summarise(Average_produ
Annual_production <- arrange(Annual_production, desc(Year))
Honey_value_annual <- cbind(Honey_value_annual,Annual_production$Average_production)
names(Honey_value_annual) <- c('Year','Value','adjValue','annualProd')
```

```
#Change of Honey annual value and productivity from 1987-2017
ggplot(data = Honey_value_annual, aes(x = Year)) +
  geom_line(aes(y = adjValue, colour = "adjValue"))+
  geom_line(aes(y = annualProd, colour = "annualProd"))  +
  ggtitle("Author: Sky Liu \n Change of Honey annual value and productivity from 1987-2017")+
  scale_y_continuous(sec.axis = sec_axis(~.*5, name = "Annual productivity [%]"))+
  scale_colour_manual(values = c("blue", "red"))+
  labs(y = "Adjusted Value [$]",
                x = "Year")
```

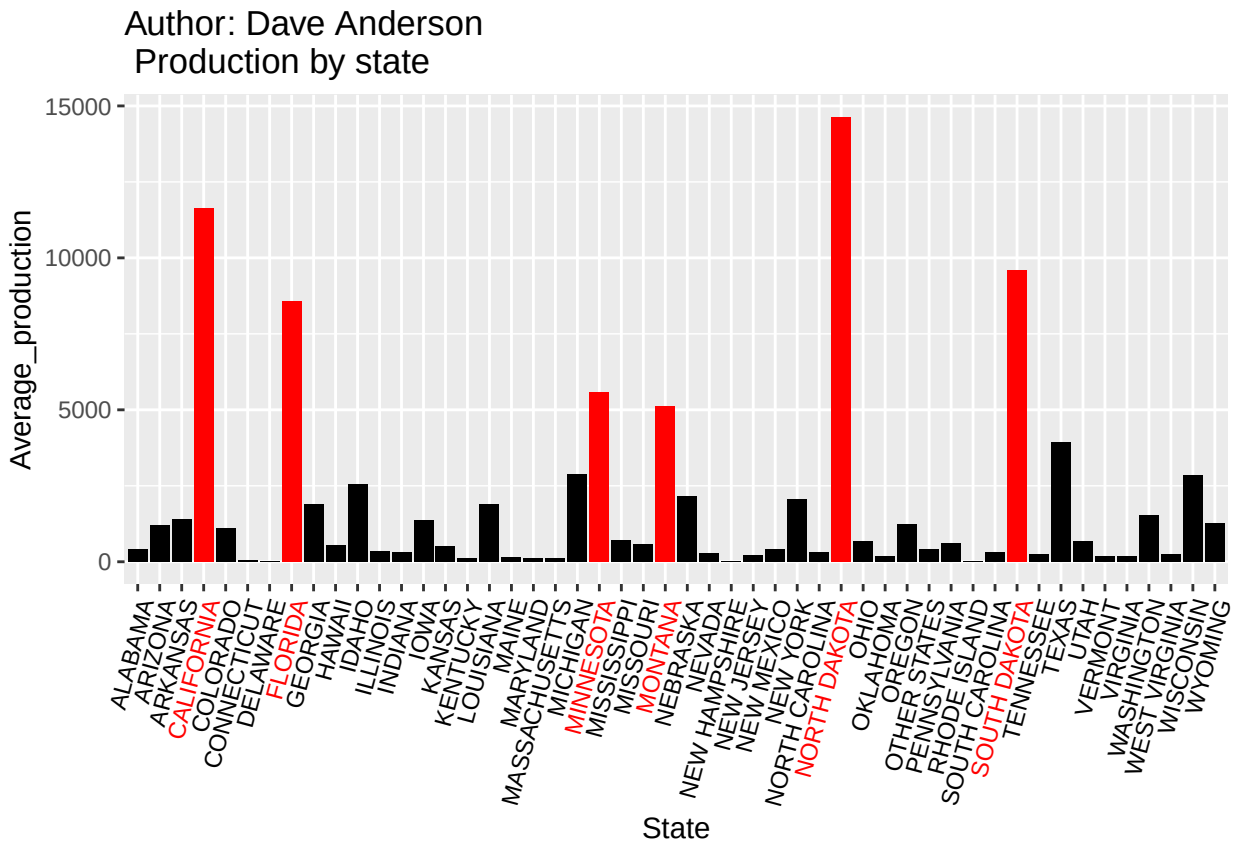



```
#Scatterplot to show relationship between productivity and loss by state.
#Colored to show overall high-producing states.
ggplot(data = Honey_by_State, mapping = aes(Average_per_colony,Loss_per_colony))+
  geom_point(aes(color = Average_production),size = 3)+
  ggtitle("Author: Dave Anderson \n Relationship b/t productivity and loss by state")
```

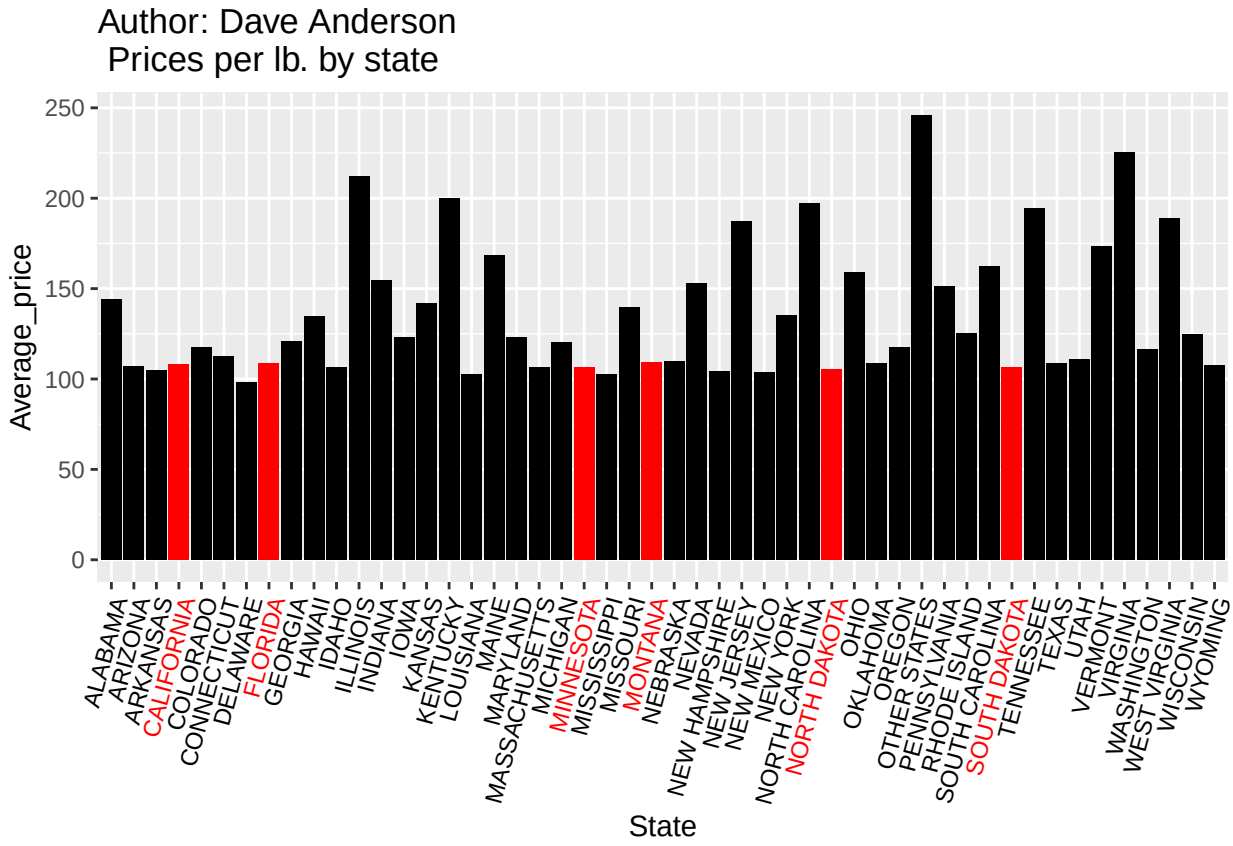
```
## Warning: Removed 4 rows containing missing values (geom_point).
```



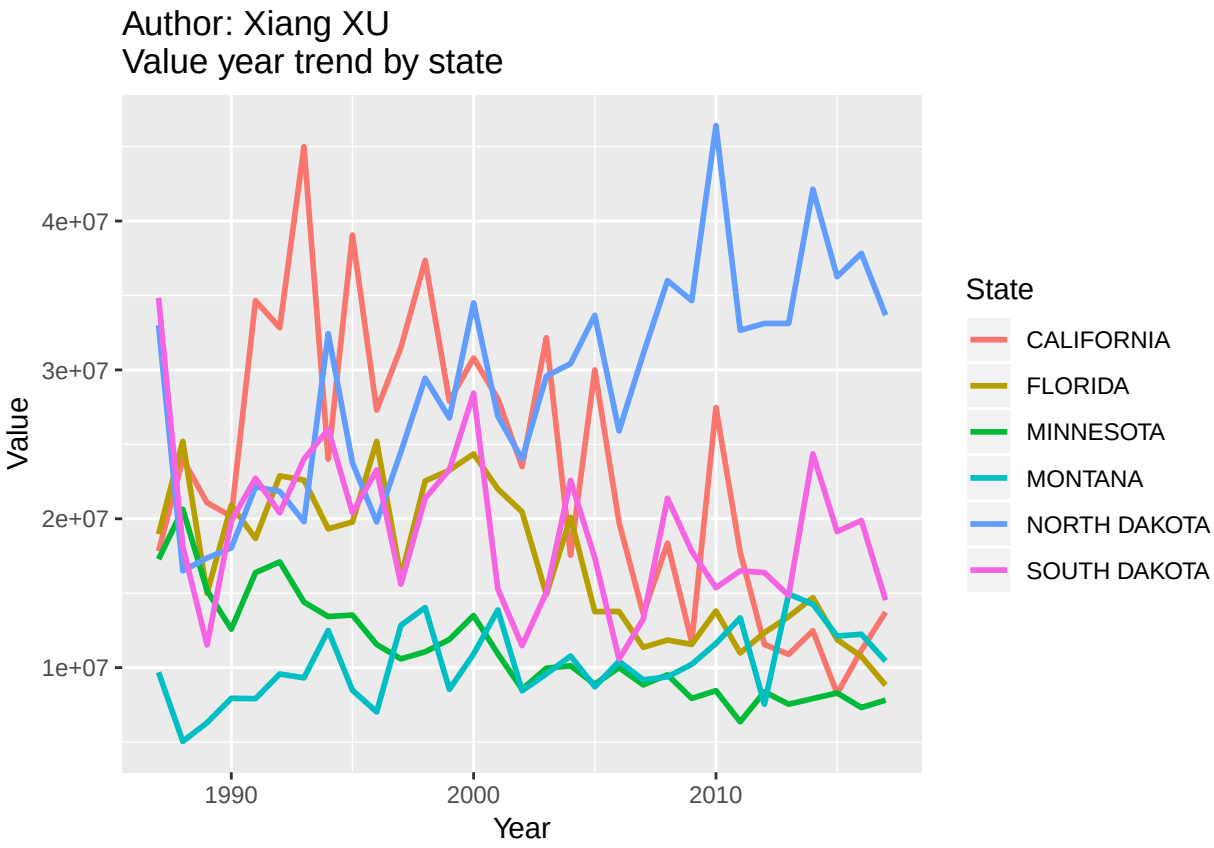

```
#Total Production by state, largest six states indicated in red.
ggplot(data = Honey_by_State, mapping = aes(State, Average_production, fill=ifelse(Average_production >
  geom_col()+
  scale_fill_manual(guide=FALSE, values=c("red", "black"))+
  theme(axis.text.x = element_text(color = ifelse(Honey_by_State$Average_production > 5000, "red", "bla
  ggtitle("Author: Dave Anderson \n Production by state")
```



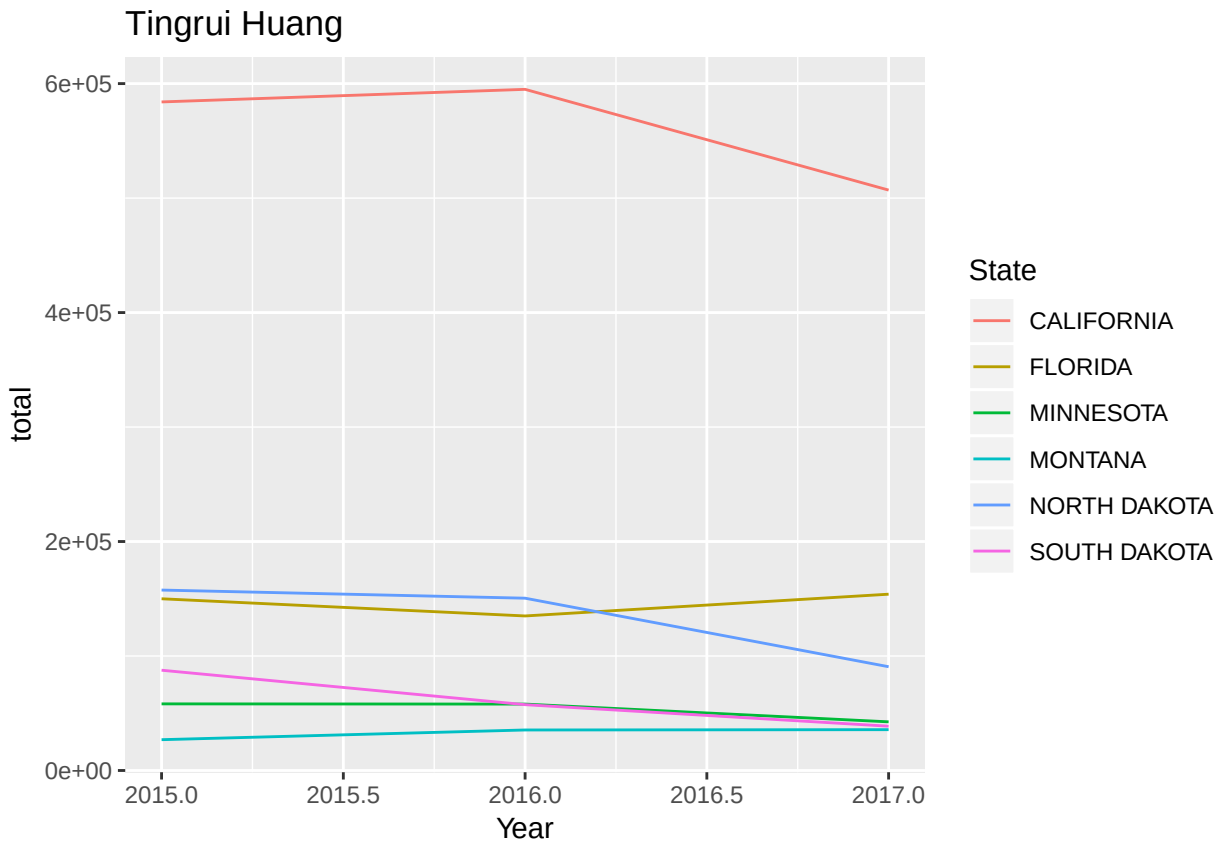

```
#Display of prices per lb. by state. Top six producing states still in red to show their low prices.
ggplot(data = Honey_by_State, mapping = aes(State ,Average_price, fill = ifelse(Average_production > 500
  geom_col()+
  scale_fill_manual(guide=FALSE, values=c("red", "black"))+
  theme(axis.text.x = element_text(color = ifelse(Honey_by_State$Average_production > 5000, "red", "bla
  ggtitle("Author: Dave Anderson \n Prices per lb. by state")
```




```
#trend of annual value of 6 top productivity states
ggplot(Honey_sixstate, aes(x=Year, y=Value ,color = State)) +
  geom_line(size = 1) +
  ggtitle("Author: Xiang XU \nValue year trend by state")
```



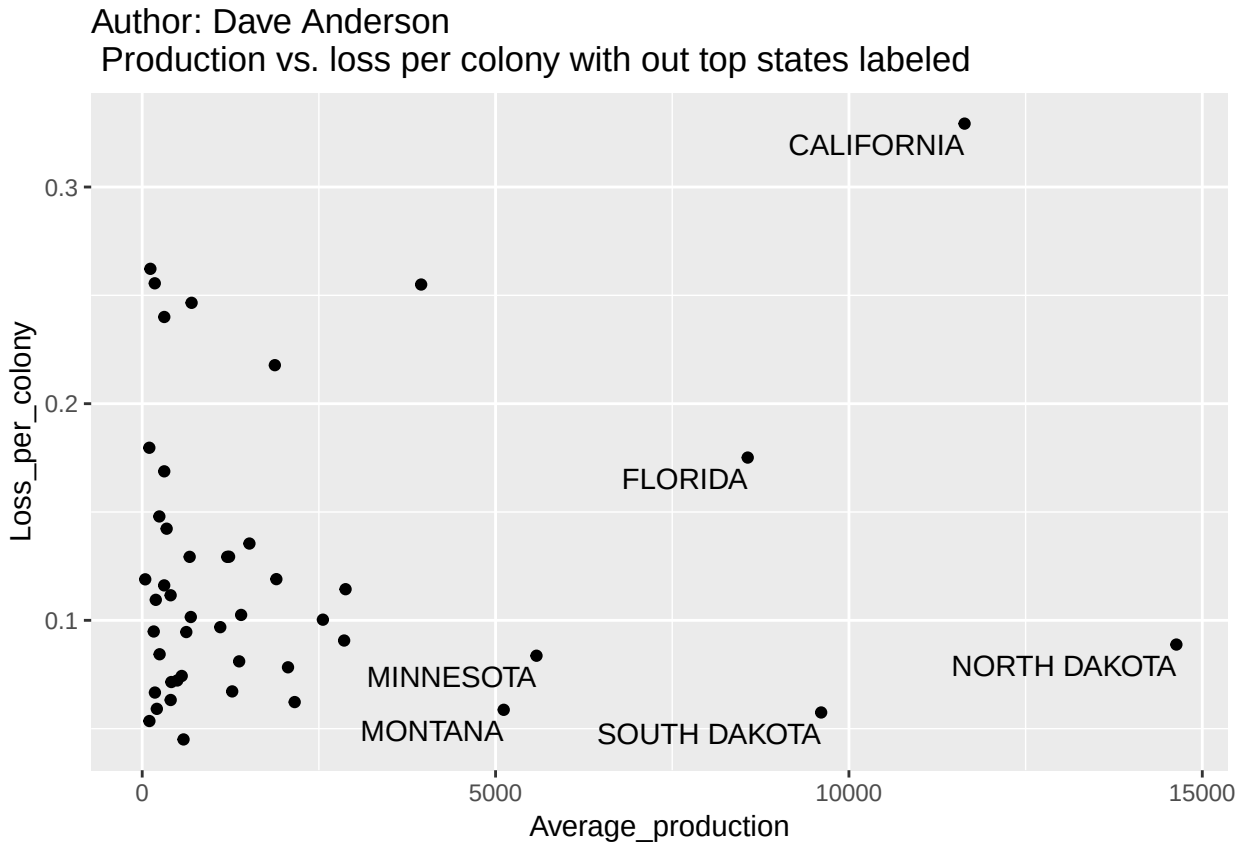

```
# annual honey lost trend of 6 top productivity states from 2015-2017
ggplot(honey_total, aes(x=Year, y=total, color=State))+geom_line()+labs(title="Tingrui Huang")
```



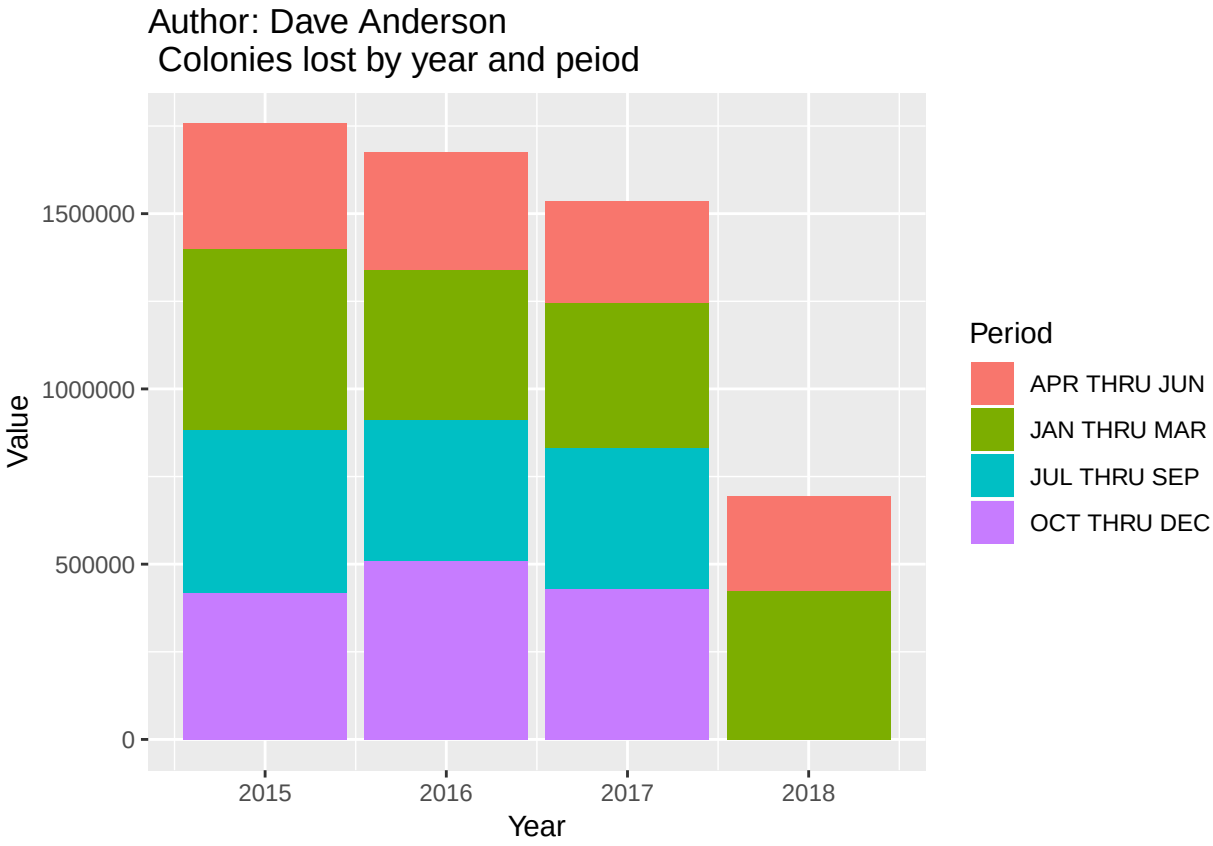

```
#Display of production vs. loss per colony with out top states labeled.
ggplot(data = Honey_by_State, mapping = aes(Average_production,Loss_per_colony, label = State))+
  geom_point() + geom_text(aes(label = ifelse(Average_production > 5000,as.character(State),'')),vjust =
   ggtitle("Author: Dave Anderson \n Production vs. loss per colony with out top states labeled")
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```

```
## Warning: Removed 4 rows containing missing values (geom_text).
```




```
#Display of colonies lost by year and peiod.
loss_by_year <- Deadout %>% filter(State == "US TOTAL") %>% group_by(Year)
ggplot(data = loss_by_year)+
  geom_col(mapping = aes(x = Year, y = Value, fill = Period))+
  ggtitle("Author: Dave Anderson \n Colonies lost by year and peiod")
```



It is interesting to see two of our top producers from, big, southern,

costal states while the other 4 are from the midwest.

Looking at prices, we see that the big producers are also among cheapest states.

The two large states have high rates of deadout colonies. The 4 big producers from the midwest have low loss rates.