honeyproduction

February 22, 2022

```
First 5 rows of data:
  state    numcol  yieldpercol    totalprod       stocks  priceperlb  \
0    AL   16000.0           71    1136000.0     159000.0        0.72
1    AZ   55000.0           60    3300000.0    1485000.0        0.64
2    AR   53000.0           65    3445000.0    1688000.0        0.59
3    CA  450000.0           83   37350000.0   12326000.0        0.62
4    CO   27000.0           72    1944000.0    1594000.0        0.70

     prodvalue  year
0     818000.0  1998
1    2112000.0  1998
2    2033000.0  1998
3   23157000.0  1998
4    1361000.0  1998

Descriptive stats of columns:
              numcol  yieldpercol      totalprod        stocks   priceperlb  \
count     626.000000   626.000000   6.260000e+02  6.260000e+02   626.000000
mean    60284.345048    62.009585   4.169086e+06  1.318859e+06     1.409569
std     91077.087231    19.458754   6.883847e+06  2.272964e+06     0.638599
min      2000.000000    19.000000   8.400000e+04  8.000000e+03     0.490000
25%      9000.000000    48.000000   4.750000e+05  1.430000e+05     0.932500
50%     26000.000000    60.000000   1.533000e+06  4.395000e+05     1.360000
75%     63750.000000    74.000000   4.175250e+06  1.489500e+06     1.680000
max    510000.000000   136.000000   4.641000e+07  1.380000e+07     4.150000

          prodvalue          year
count  6.260000e+02    626.000000
mean   4.715741e+06   2004.864217
std    7.976110e+06      4.317306
min    1.620000e+05   1998.000000
25%    7.592500e+05   2001.000000
50%    1.841500e+06   2005.000000
75%    4.703250e+06   2009.000000
max    6.961500e+07   2012.000000

['ND', 'CA', 'SD', 'FL', 'MT']
```
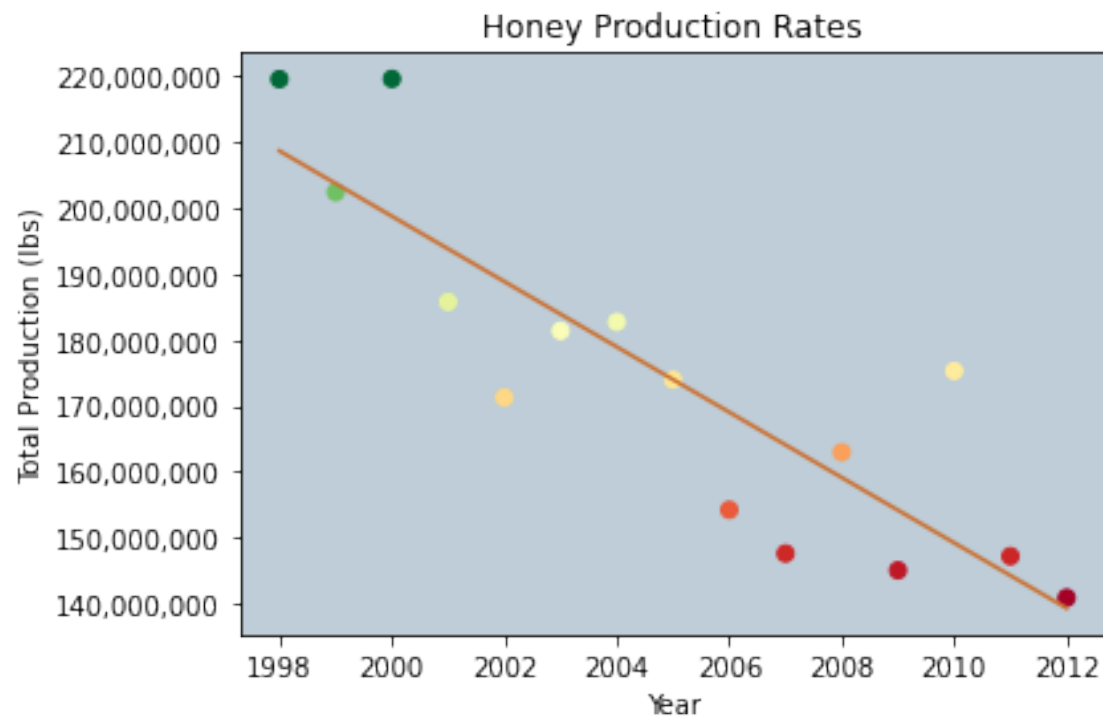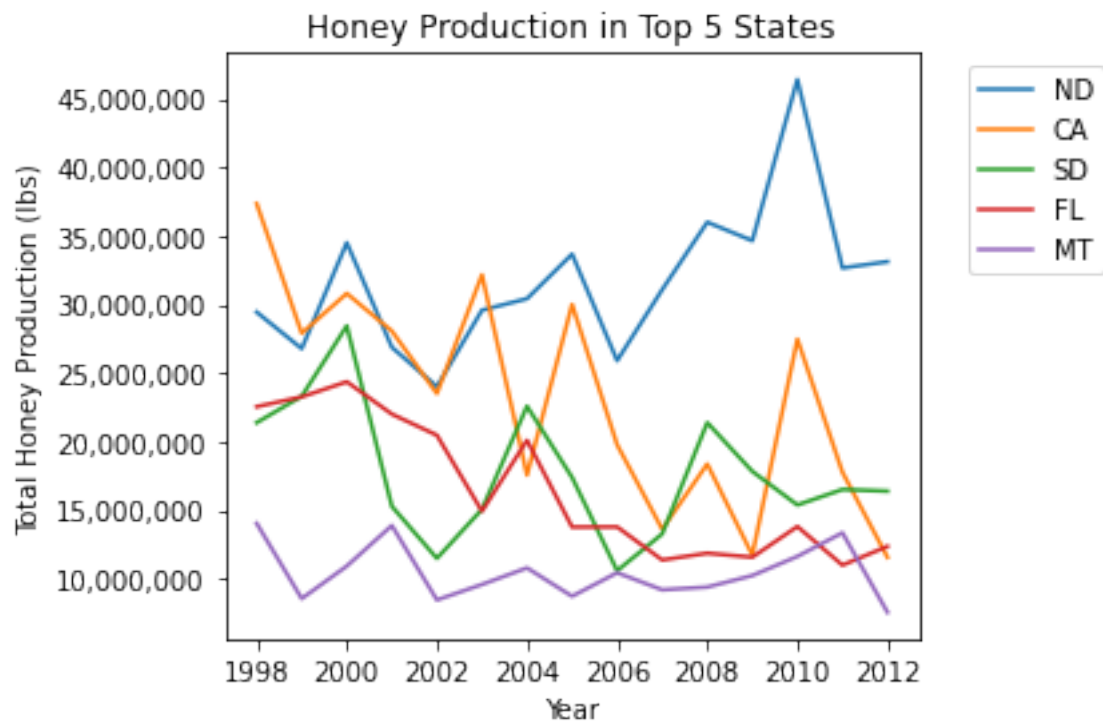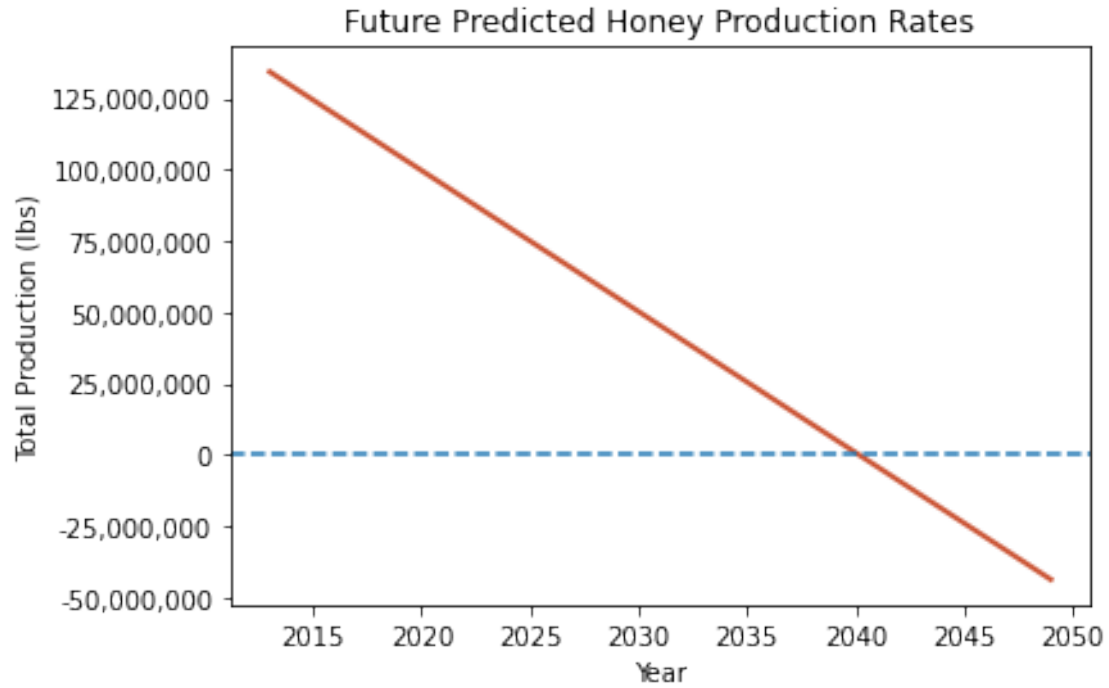
Honey Production in Top 5 States

Honey Production Rates

<Figure size 432x288 with 0 Axes>
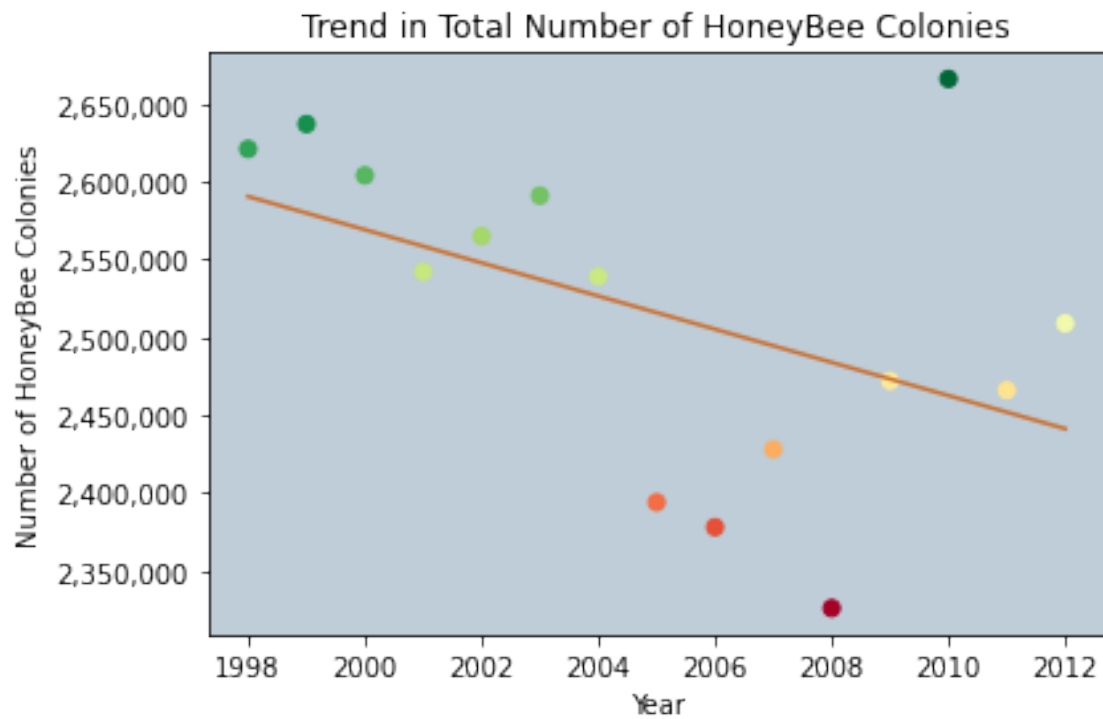
Future Predicted Honey Production Rates

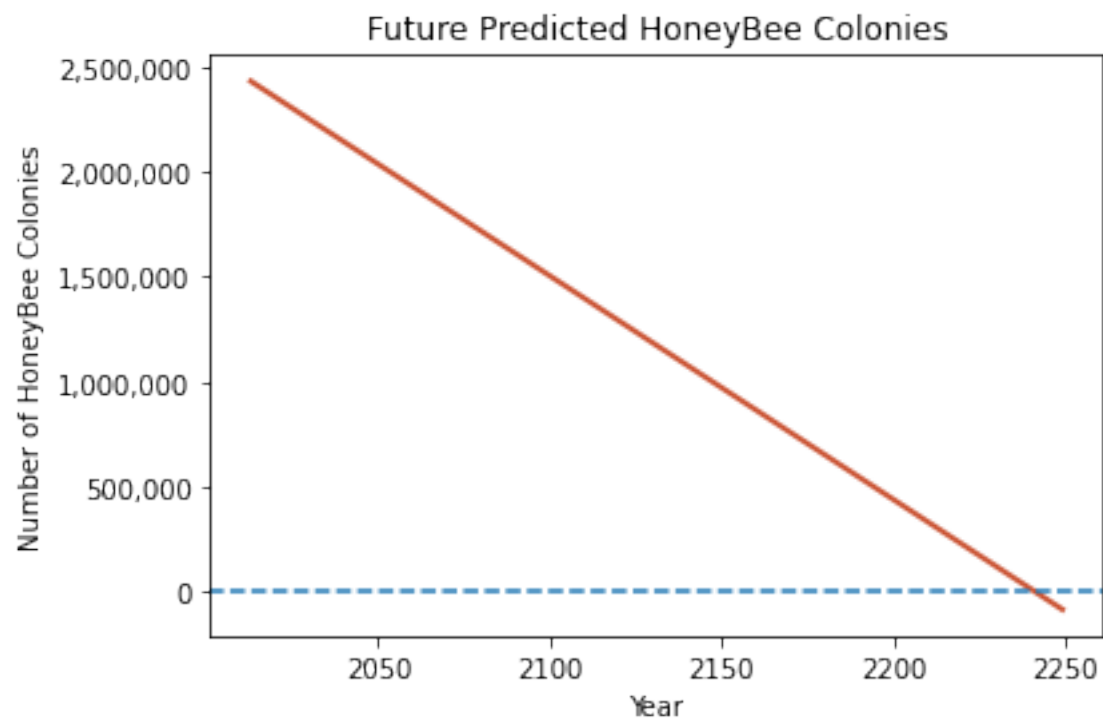The predicted honey production in 2023 is 84869809.5 pounds.
The predicted honey production in 2035 is 25456438.1 pounds.
This model predicts that honey production will reach 0 in the year 2040 if this trend continues.

<Figure size 432x288 with 0 Axes>

Trend in Total Number of HoneyBee Colonies

<Figure size 432x288 with 0 Axes>
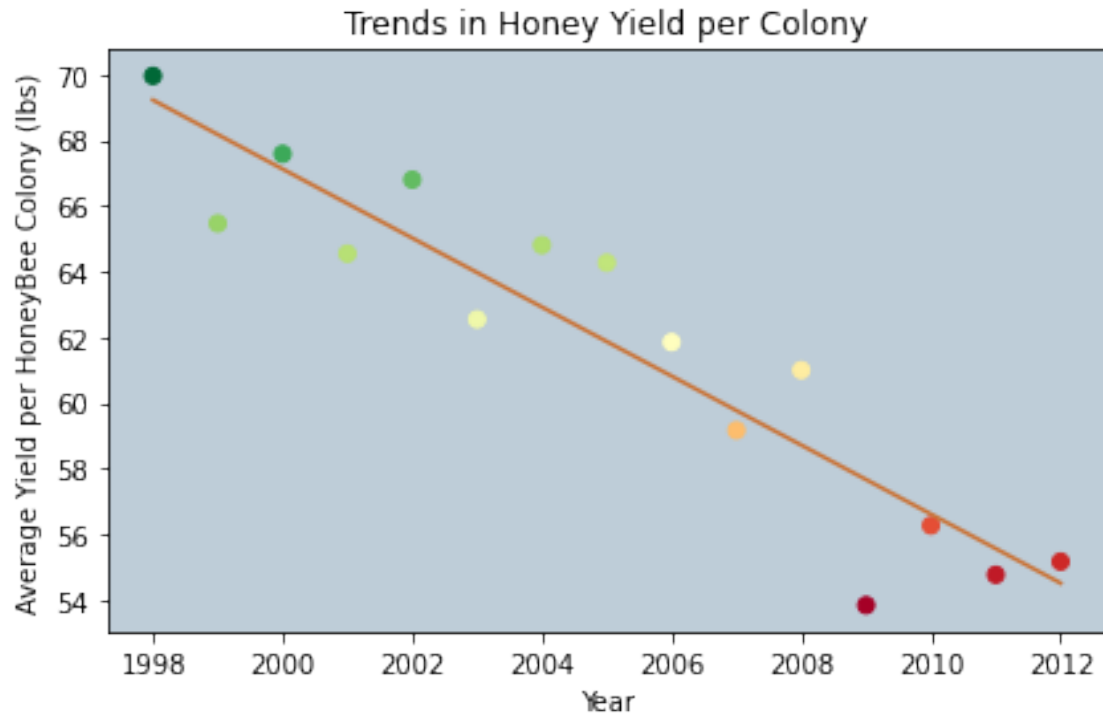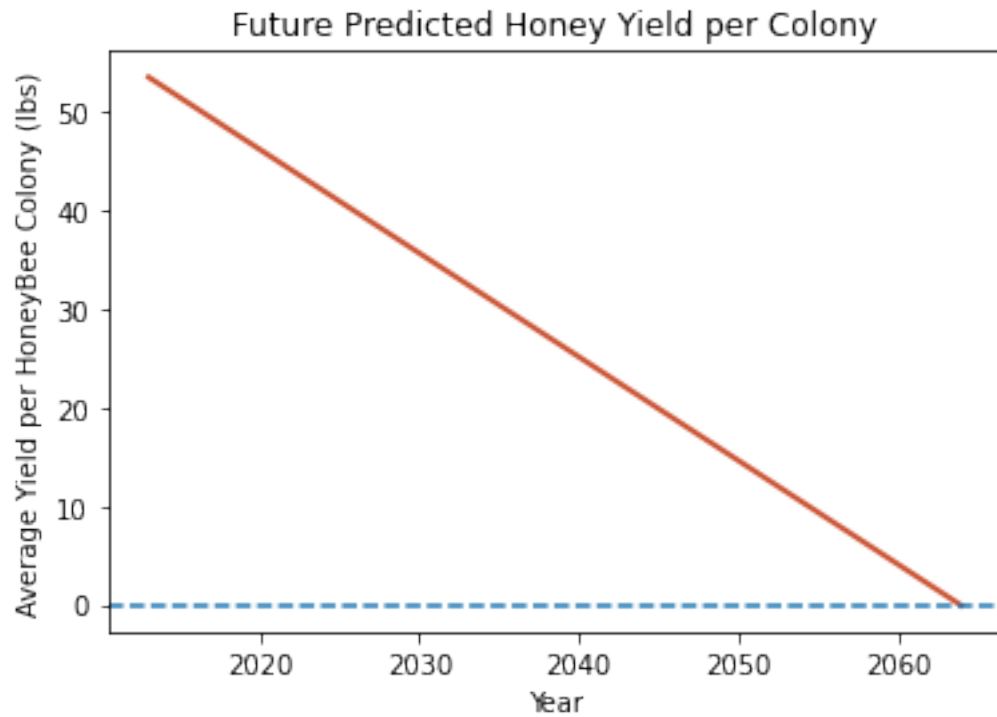
Future Predicted HoneyBee Colonies

The predicted number of HoneyBee colonies in 2023 is 2324038.1 colonies.
The predicted number of HoneyBee colonies in 2050 is 2036295.2 colonies.
The predicted number of HoneyBee colonies in 2100 is 1503438.1 colonies.
The predicted number of HoneyBee colonies in 2200 is 437723.8 colonies.
This model predicts that the number of colonies will reach 0 in the year 2241 if
this trend continues.

<Figure size 432x288 with 0 Axes>

Trends in Honey Yield per Colony

<Figure size 432x288 with 0 Axes>

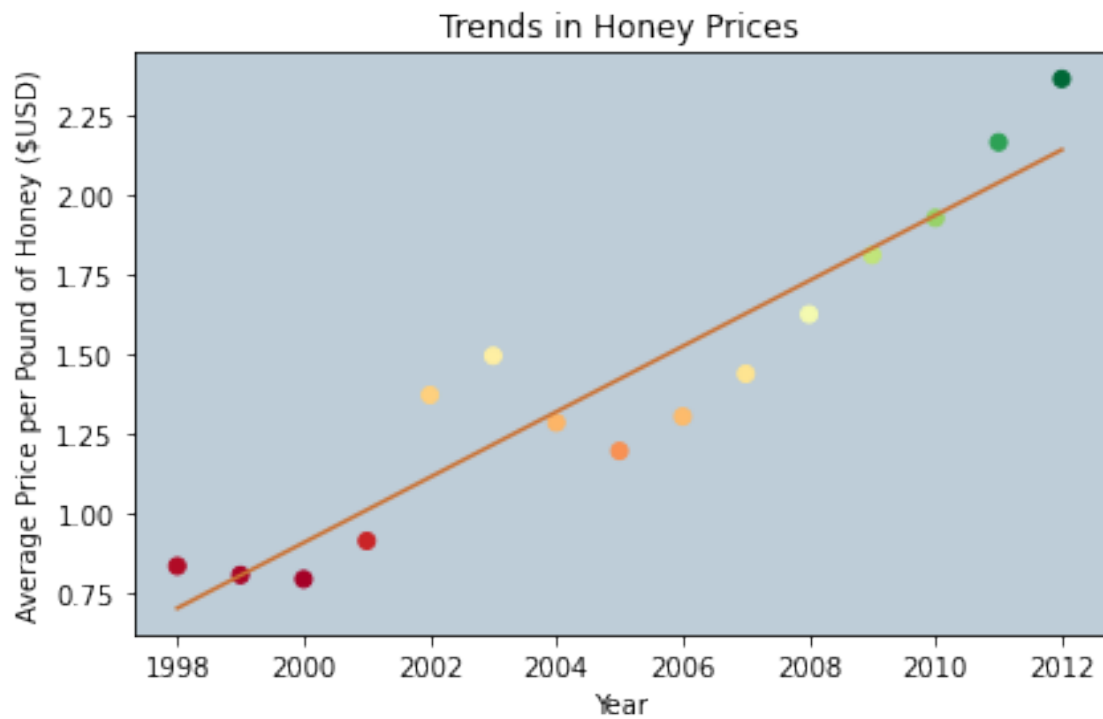Future Predicted Honey Yield per Colony

The predicted yield per colony in 2023 is 43. pounds.
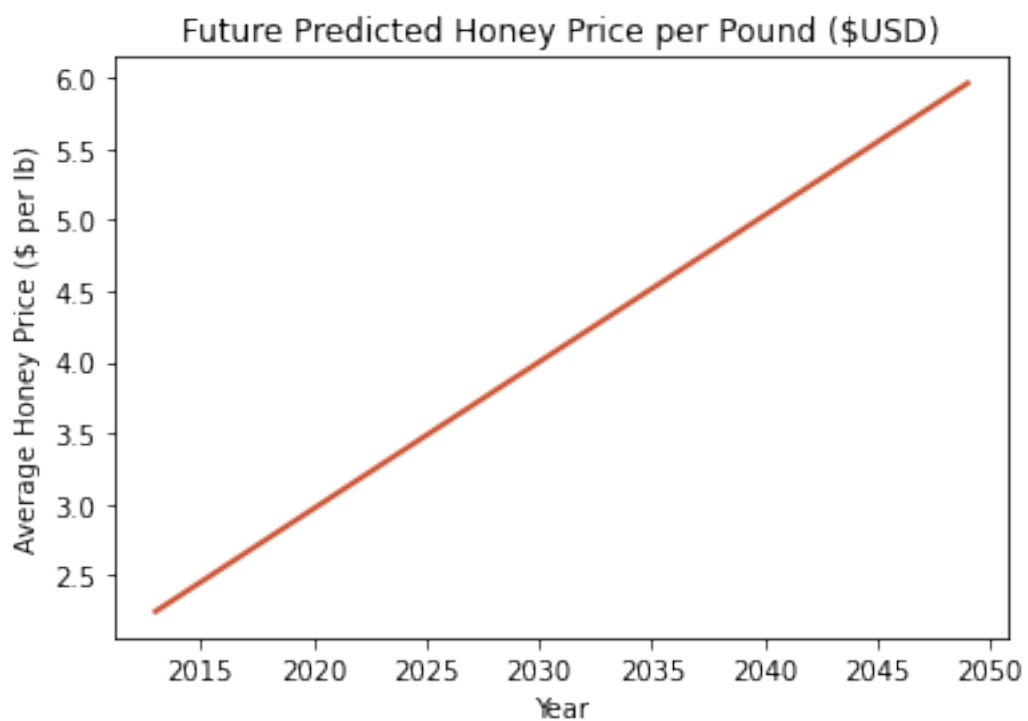The predicted yield per colony in 2050 is 14.6 pounds.
The predicted yield per colony in 2060 is 4.1 pounds.
This model predicts that the average yield per honeybee colony will reach 0 in the year 2063 if this trend continues.
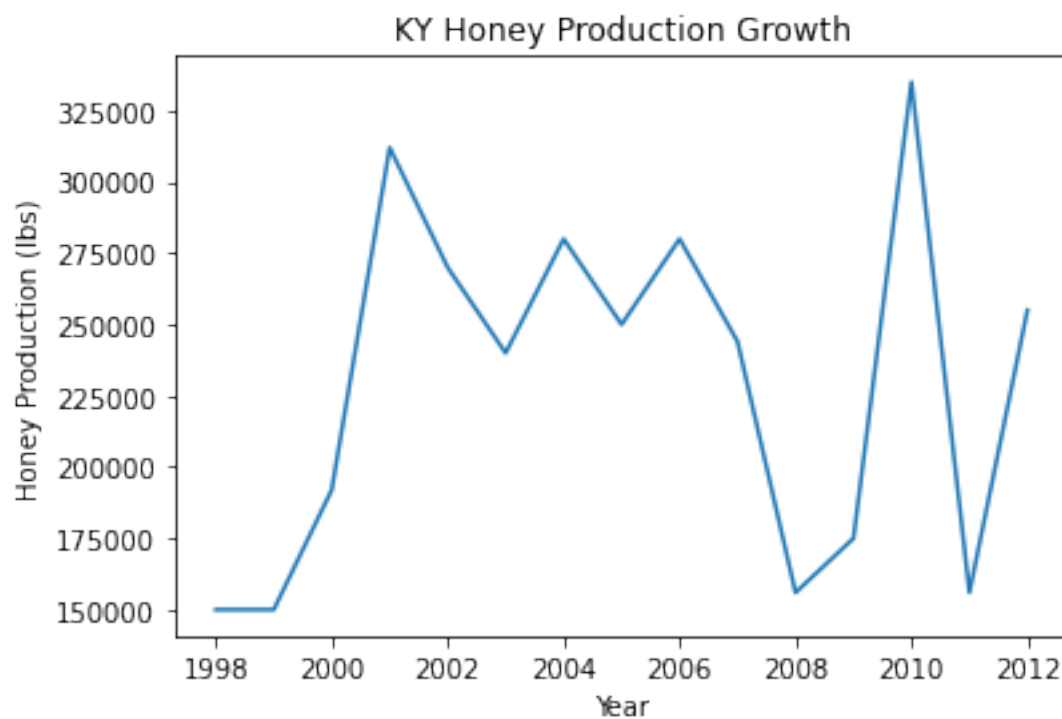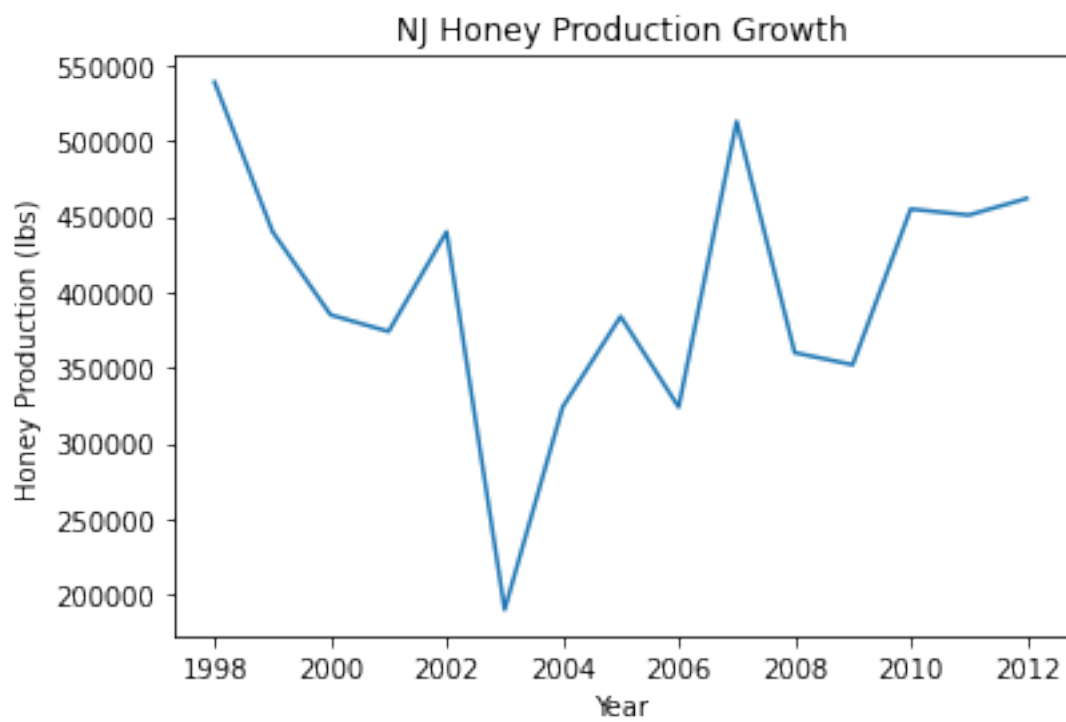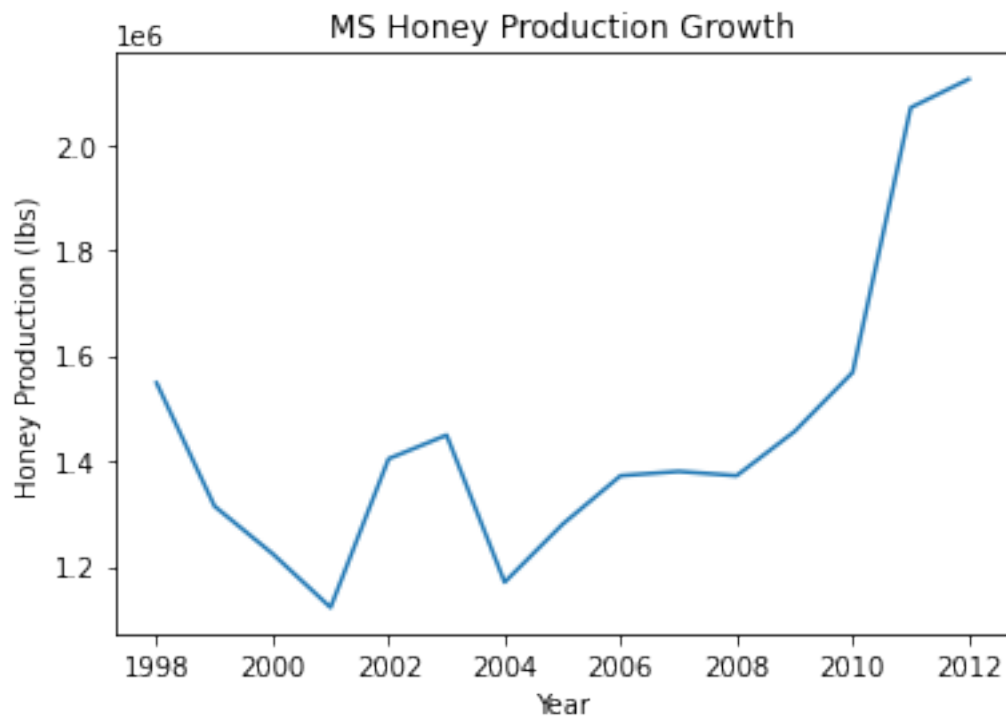
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Trends in Honey Prices

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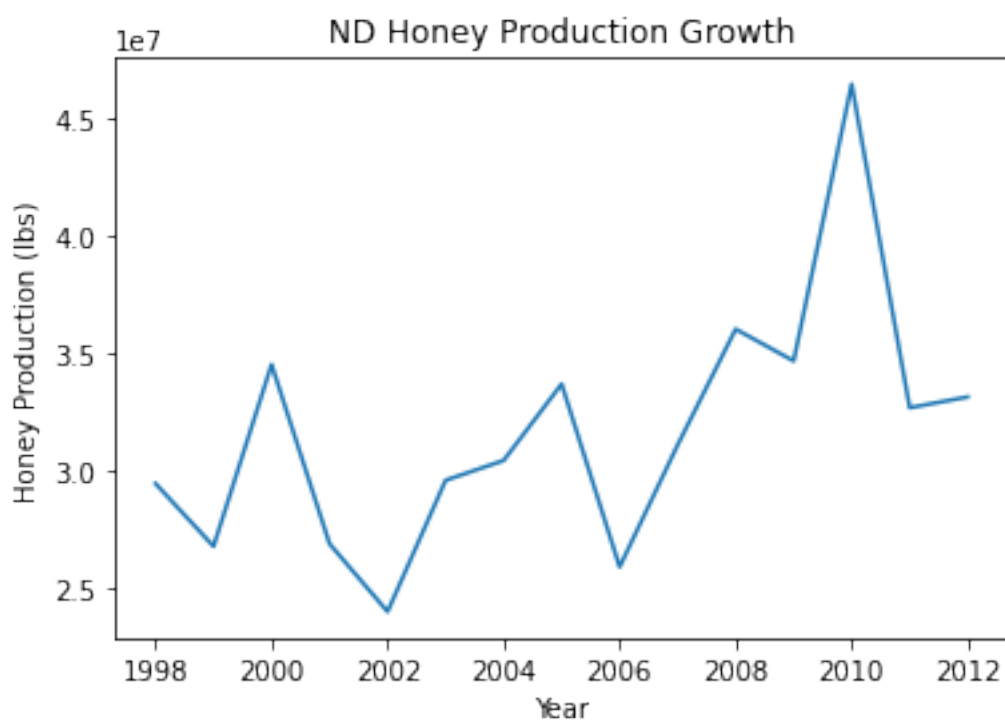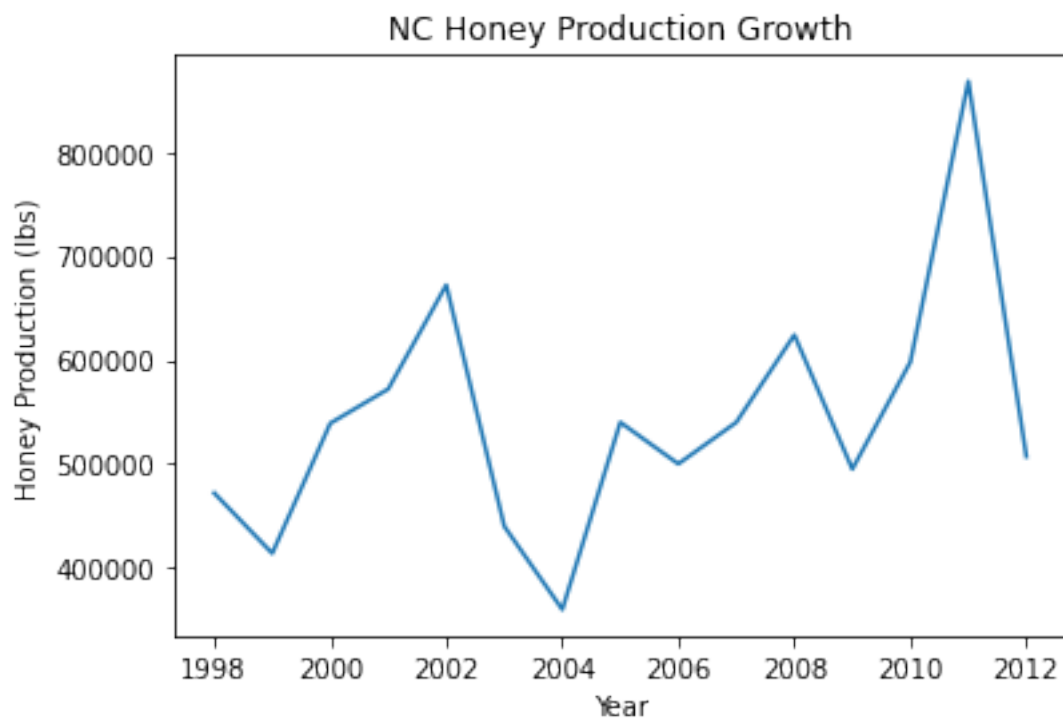

Future Predicted Honey Price per Pound ($USD)

The predicted average price for honey in 2022 is $3.18 per pound.

 array([3.18])

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KY Honey Production Growth

MS Honey Production Growth

NJ Honey Production Growth
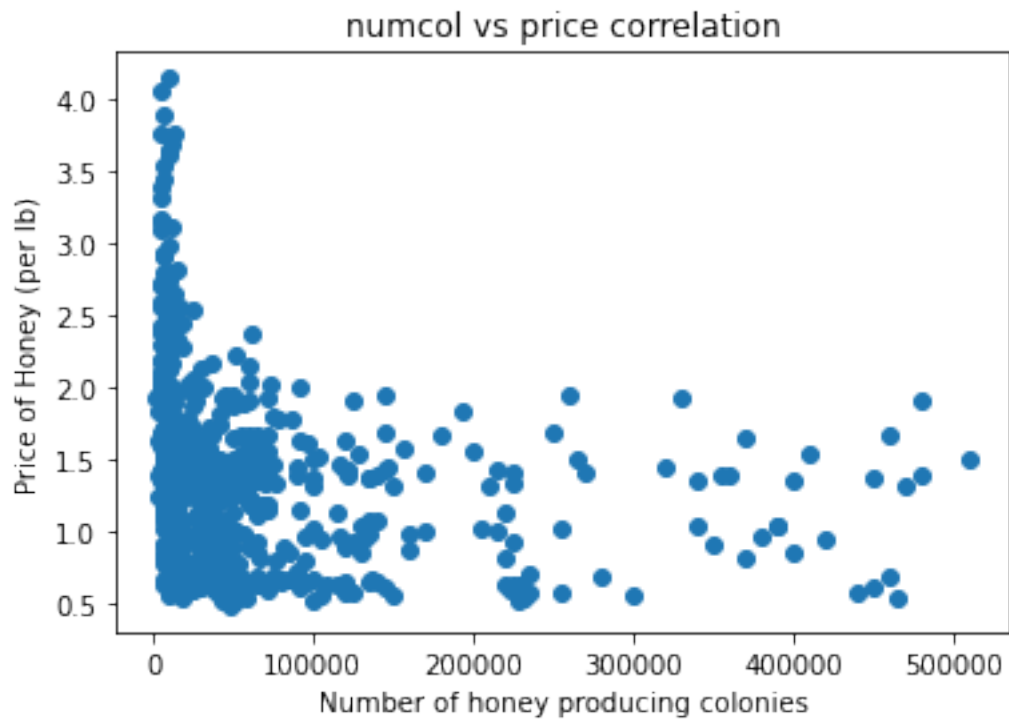
NC Honey Production Growth
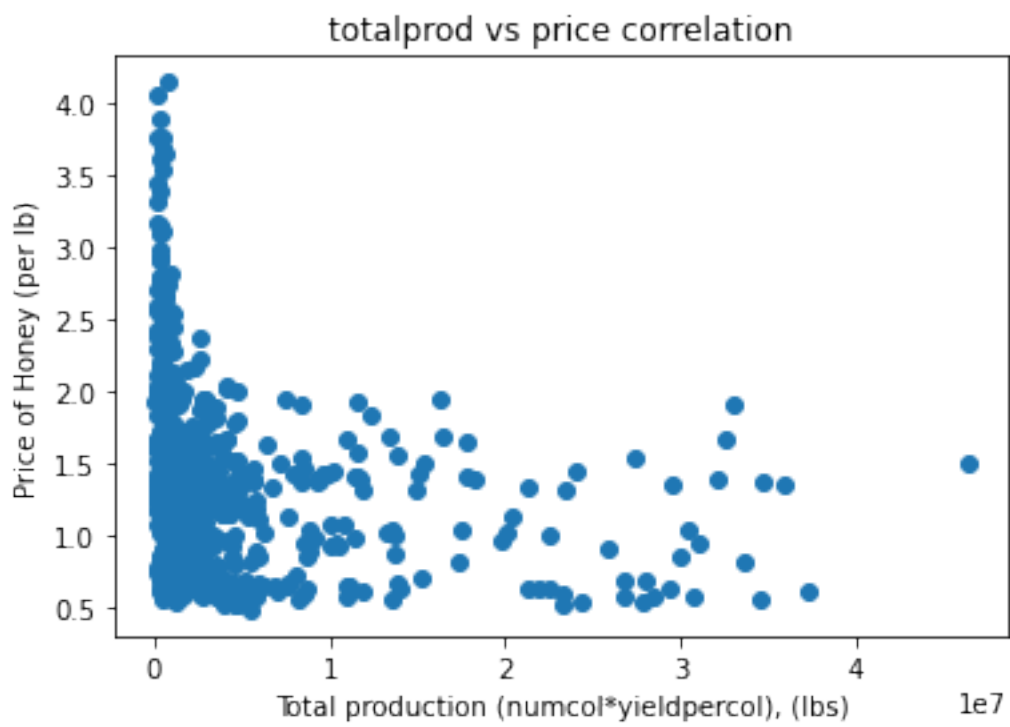

ND Honey Production Growth
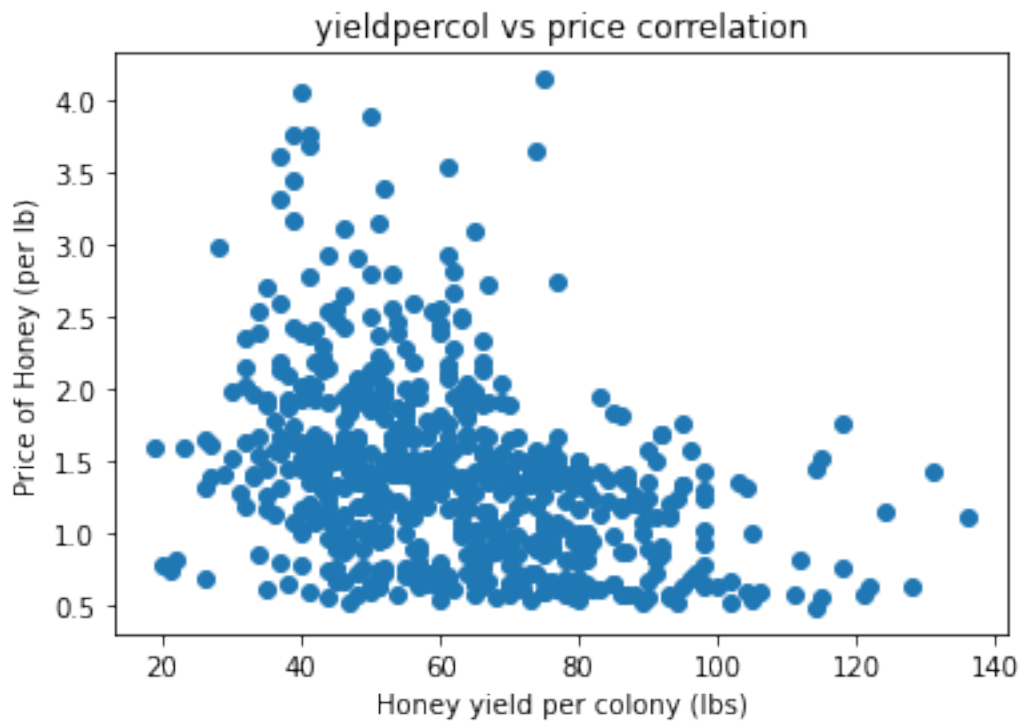
5 States with the best growth in Honey Production (average increase in lbs per year):

```
      state        growth
26      ND    664928.571429
18      MS     41400.000000
25      NC     11257.142857
13      KY      2157.142857
22      NJ       696.428571
```

5 States with the worst decline in Honey Production (average decrease in lbs per year):
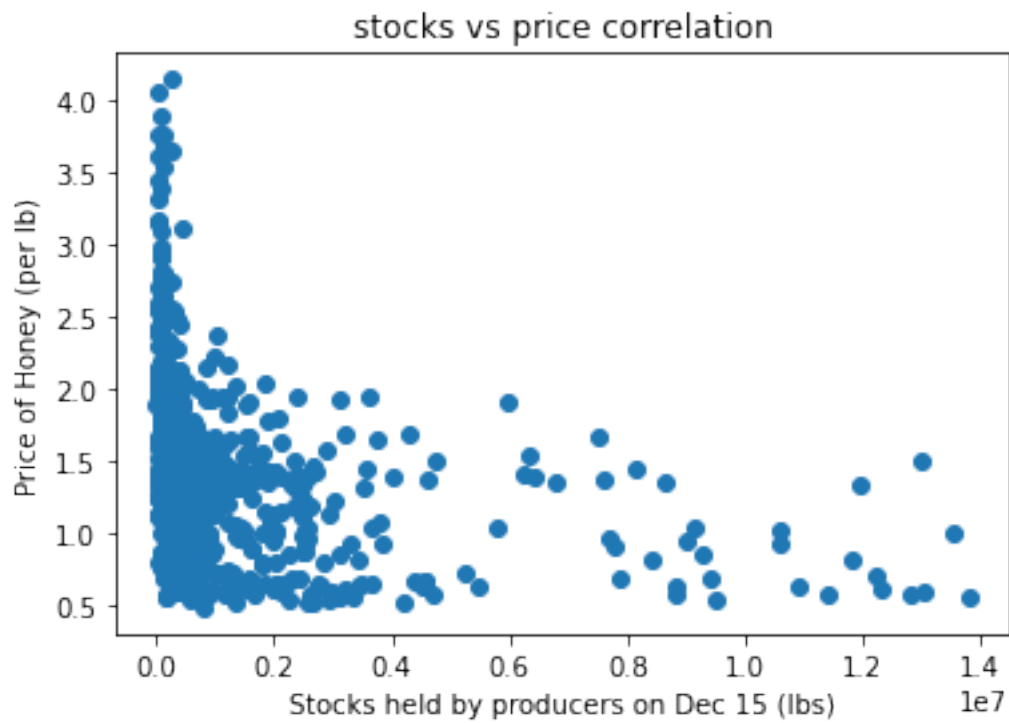
```
      state        growth
38      WI    -2.618464e+05
17      MN    -3.167679e+05
30      SD    -4.170214e+05
5       FL    -9.956500e+05
3       CA    -1.335000e+06
```

yieldpercol vs price correlation

totalprod vs price correlation

stocks vs price correlation

(Scatter plot: Price of Honey (per lb) on the y-axis ranging from about 0.5 to 4.0, versus Stocks held by producers on Dec 15 (lbs) on the x-axis ranging from 0.0 to 1.4 ×10⁷)

year vs price correlation

(Scatter plot: Price of Honey (per lb) on the y-axis ranging from about 0.5 to 4.0, versus Year the data pertains to on the x-axis ranging from 1998 to 2012)

```
Residual analysis score of training set: 0.5761941712046472
Residual analysis score of test set: 0.5504519137801149
Moderate correlation

Feature coefficients:
['numcol', 'yieldpercol', 'totalprod', 'stocks', 'year']
[[-5.27265980e-06 -8.24926870e-03  6.33229485e-08 -3.26007747e-08
    9.73578231e-02]]

Correlation Coefficients with Honey Price:

 numcol        -0.232701
 yieldpercol   -0.358646
 totalprod     -0.264499
 stocks        -0.305867
 priceperlb     1.000000
 prodvalue     -0.089567
 year           0.693984
 Name: priceperlb, dtype: float64
```