avocado sales analysis

In [163]:
```
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.ticker as mtick
import datetime as dt
import seaborn as sns
import numpy as np
```

In [164]:
```
df=pd.read_csv(r"C:\Users\berid\OneDrive\Desktop\mydata\avocado.csv",index_col=0)
```

In [194]:
```
df
```

Out[194]:

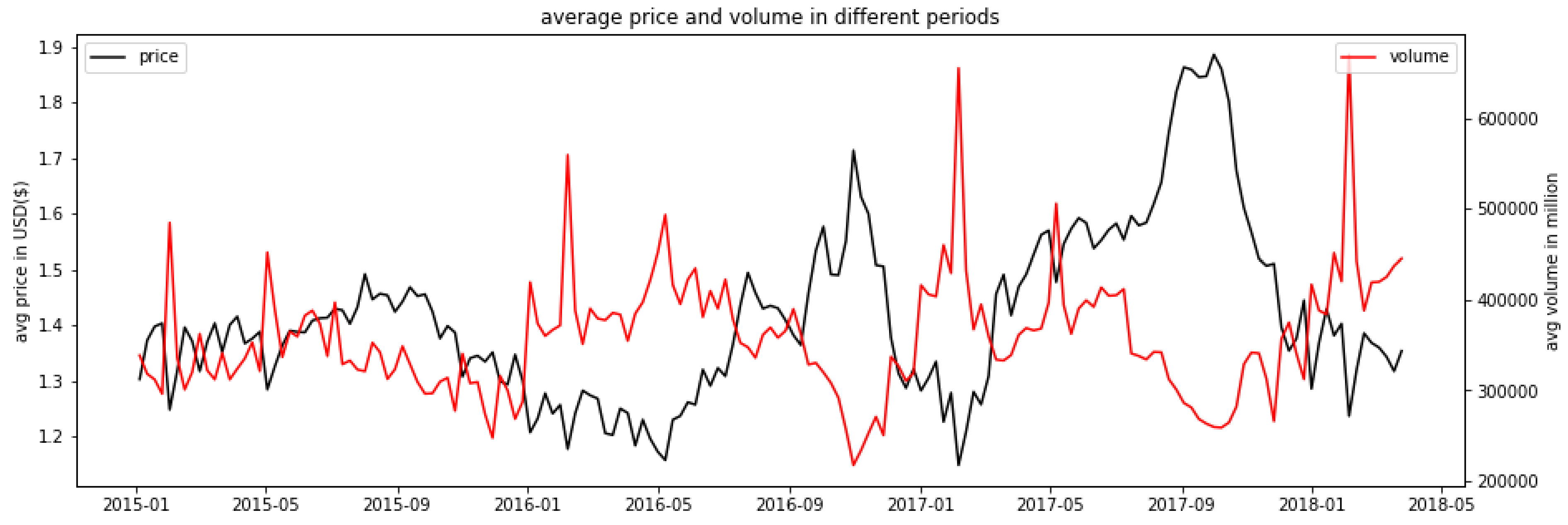
	date	averageprice	totalvolume	4046	4225	4770	totalbags	smallbags	largebags	xlargebags	type	year	region	monthnum	month
0	2015-12-27	1.33	64236.62	1036.74	54454.85	48.16	8696.87	8603.62	93.25	0.0	conventional	2015	Albany	12	Dec
1	2015-12-20	1.35	54876.98	674.28	44638.81	58.33	9505.56	9408.07	97.49	0.0	conventional	2015	Albany	12	Dec
2	2015-12-13	0.93	118220.22	794.70	109149.67	130.50	8145.35	8042.21	103.14	0.0	conventional	2015	Albany	12	Dec
3	2015-12-06	1.08	78992.15	1132.00	71976.41	72.58	5811.16	5677.40	133.76	0.0	conventional	2015	Albany	12	Dec
4	2015-11-29	1.28	51039.60	941.48	43838.39	75.78	6183.95	5986.26	197.69	0.0	conventional	2015	Albany	11	Nov
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	2018-02-04	1.32	7363.56	89.59	440.31	0.00	6833.66	6827.78	5.88	0.0	organic	2018	Tampa	2	Feb
8	2018-01-28	1.61	7695.89	156.01	859.20	0.00	6680.68	5567.39	1113.29	0.0	organic	2018	Tampa	1	Jan
9	2018-01-21	1.52	6871.05	76.66	407.09	0.00	6387.30	6375.55	11.75	0.0	organic	2018	Tampa	1	Jan
10	2018-01-14	1.53	7238.04	106.98	496.61	0.00	6634.45	6634.45	0.00	0.0	organic	2018	Tampa	1	Jan
11	2018-01-07	1.51	7370.53	42.17	400.58	0.00	6927.78	6921.12	6.66	0.0	organic	2018	Tampa	1	Jan

15210 rows × 15 columns

In [165]:
```
df.columns=df.columns.str.strip().str.lower().str.replace(" ","")
df=df.loc[:,df.columns.isin(["unnamed:0"])==False]
df["date"]=pd.to_datetime(df["date"])
df["year"]=df["date"].dt.year
df["monthnum"]=df["date"].dt.month
df["month"]=df["date"].dt.month_name().str[:3]

df=df[df.region.str.contains("total|west|east|south|north",regex=True,case=False)==False]
```

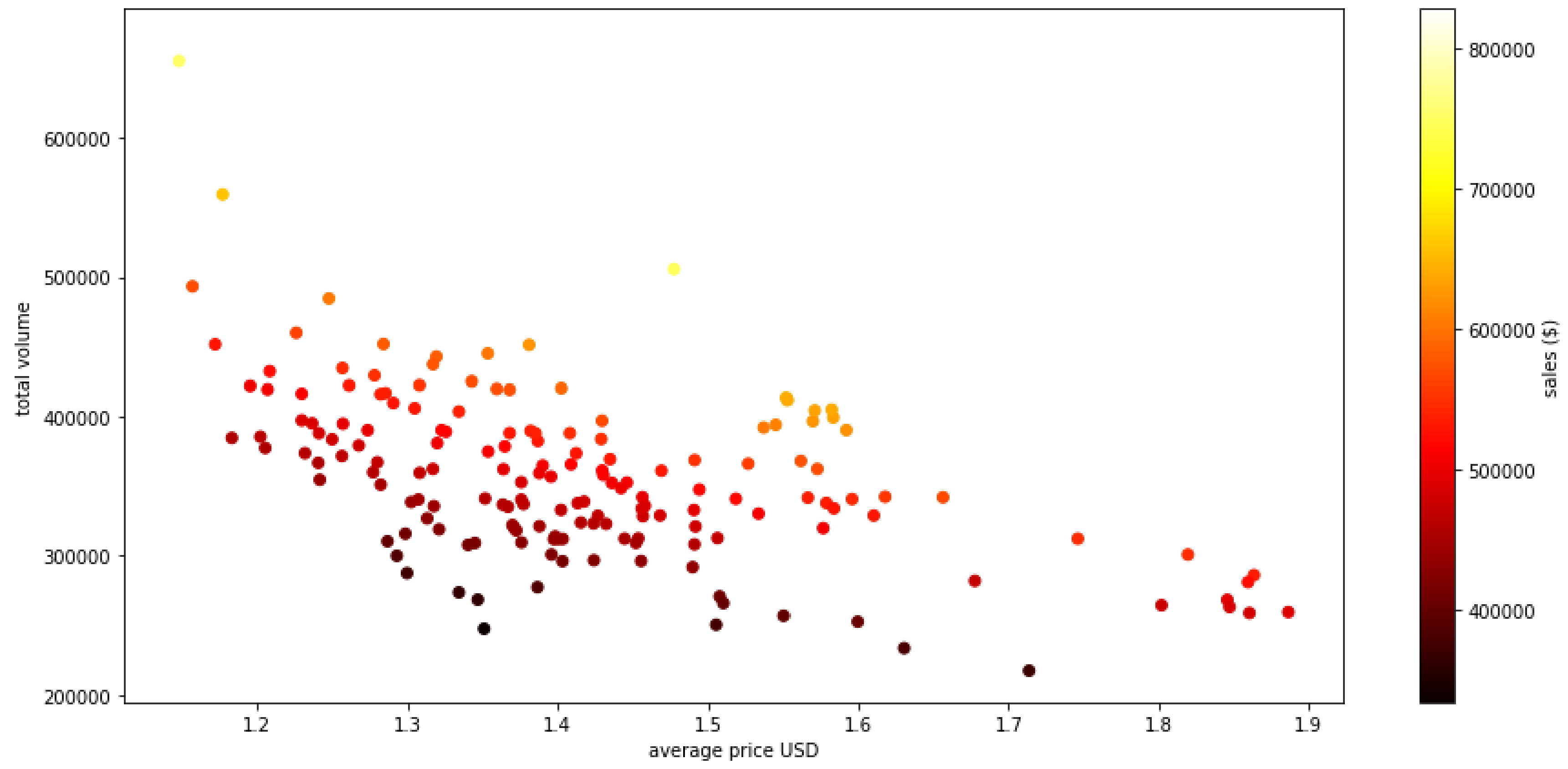
how average price and volume differ over time

In [167]:
```
g1=df.groupby("date")["averageprice"].mean().reset_index().sort_values("date")
g2=df.groupby("date")["totalvolume"].mean().reset_index().sort_values("date")

fig,ax1=plt.subplots(figsize=(15,5))
ax2=ax1.twinx()
ax1.plot(g1.date,g1.averageprice,color="k",label="price")
ax2.plot(g2.date,g2.totalvolume,color="r",label="volume")
ax1.set_ylabel("avg price in USD($)")
ax2.set_ylabel("avg volume in million")
ax1.legend(loc="upper left")
ax2.legend(loc="upper right")
plt.title("average price and volume in different periods")
plt.show()
```



is there correlation between average pirce and volume?

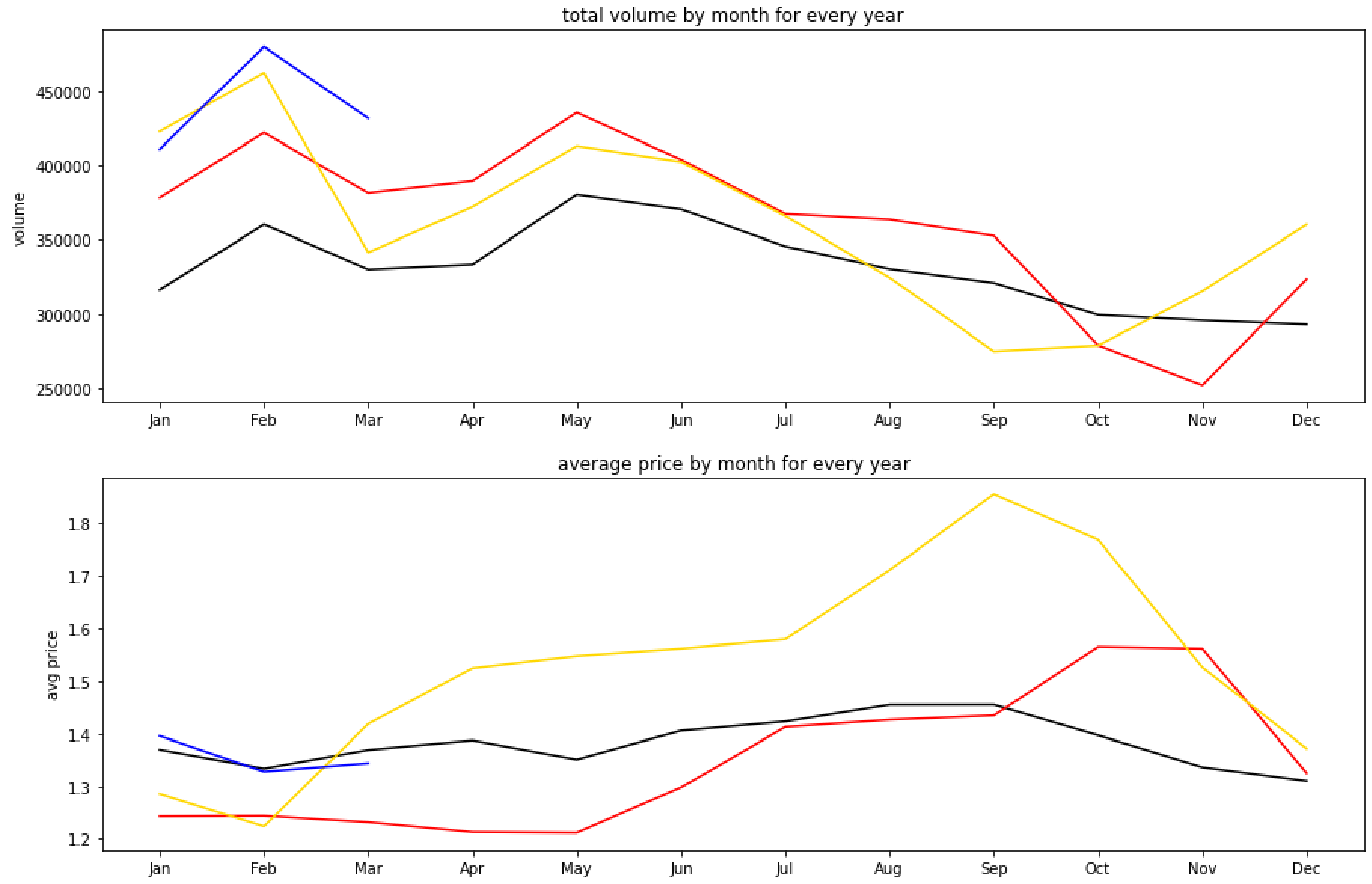
In [196]:
```
plt.figure(figsize=(15,7))
plt.scatter(g1.averageprice,g2.totalvolume,c=g1.averageprice*g2.totalvolume,cmap="hot")
plt.colorbar().set_label("sales ($)")
plt.xlabel('average price USD')
plt.ylabel("total volume")
plt.show()
g1.averageprice.corr(g2.totalvolume)
```



Out[196]:
```
-0.5328284424020031
```

In [193]:

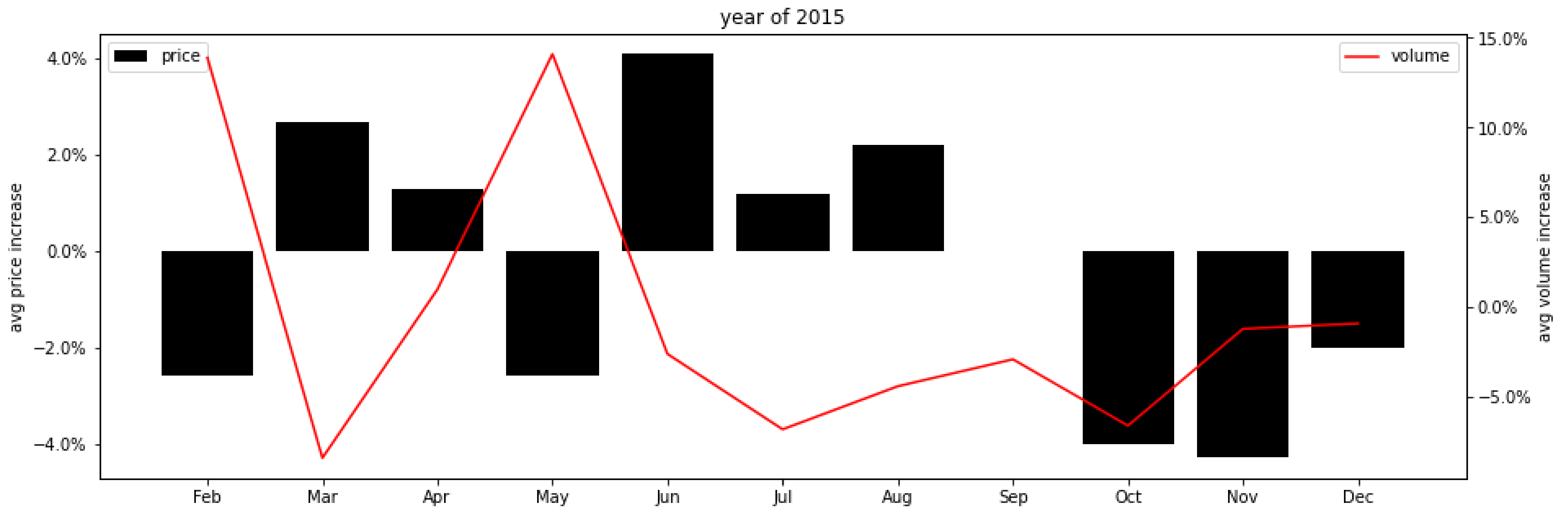
```
grouped=df.groupby(["year","month","monthnum"]).agg({"averageprice":"mean","totalvolume":"mean"}).reset_index()
grouped["year"]=grouped["year"].astype(str)

pivot=grouped.pivot(["month","monthnum"],"year",["totalvolume","averageprice"]).reset_index().sort_values("monthnum")

fig,axes=plt.subplots(2,1,figsize=(15,10))
plt.subplot(2,1,1)
plt.plot(pivot.month,pivot["totalvolume"]["2015"],color="k")
plt.plot(pivot.month,pivot["totalvolume"]["2016"],color="r")
plt.plot(pivot.month,pivot["totalvolume"]["2017"],color="gold")
plt.plot(pivot.month,pivot["totalvolume"]["2018"],color="b")
plt.title("total volume by month for every year")
plt.ylabel("volume")

plt.subplot(2,1,2)
plt.plot(pivot.month,pivot["averageprice"]["2015"],color="k")
plt.plot(pivot.month,pivot["averageprice"]["2016"],color="r")
plt.plot(pivot.month,pivot["averageprice"]["2017"],color="gold")
plt.plot(pivot.month,pivot["averageprice"]["2018"],color="b")
plt.title("average price by month for every year")
plt.ylabel("avg price")
plt.show()
```

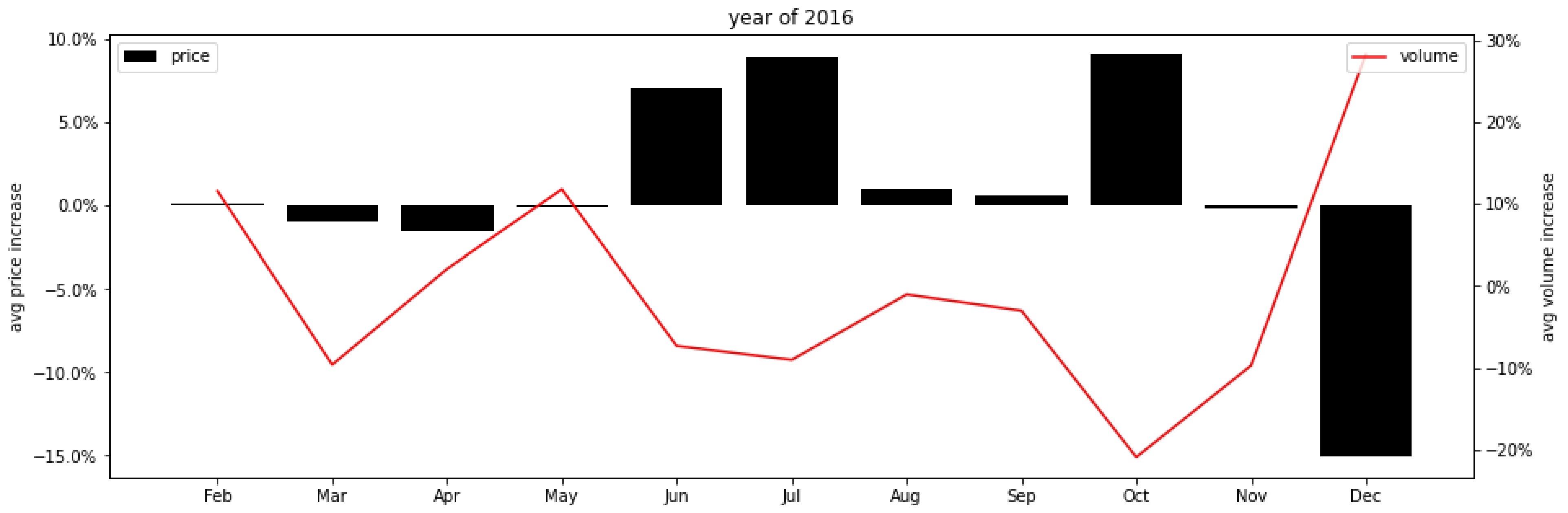


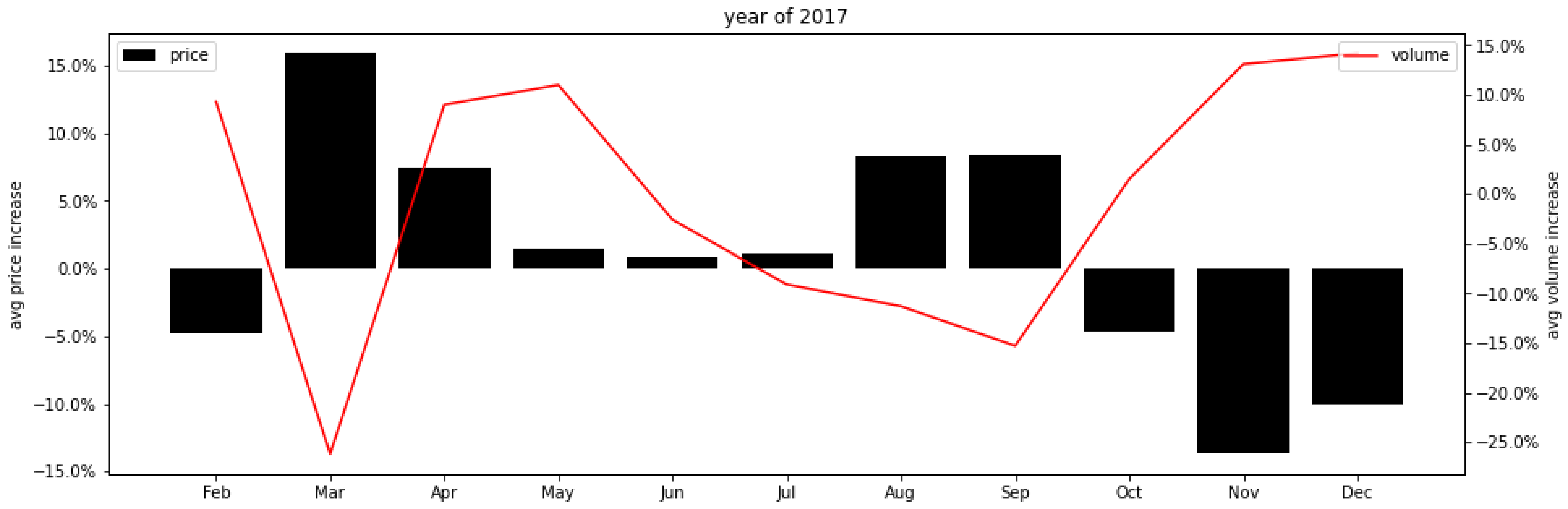
total volume by month for every year

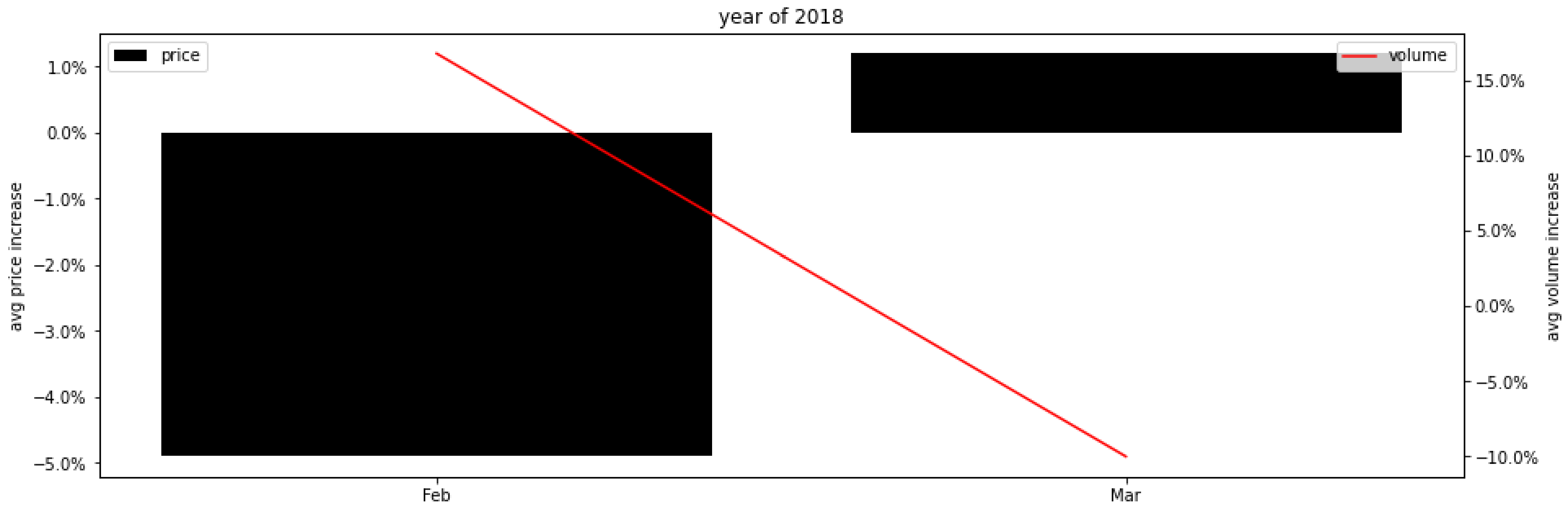
average price by month for every year

In [199]:
```
for y in sorted(df.year.unique()):
    g=df[df.year==y].groupby(["month","monthnum"]).agg({"averageprice":"mean","totalvolume":"mean"}).reset_index().sort_values("monthnum")
    g[["prev_price","prev_volum"]]=g[["averageprice","totalvolume"]].shift(1)
    g["price_increase"]=((g["averageprice"]-g.prev_price)/g.prev_price*100).round(1)
    g["volume_increase"]=((g["totalvolume"]-g.prev_volum)/g.prev_volum*100).round(1)

    fig,ax1=plt.subplots(figsize=(15,5))
    ax1.bar(g.month,g.price_increase,color="k",label="price")
    ax1.legend(loc="upper left")
    plt.ylabel("avg price increase")
    plt.gca().yaxis.set_major_formatter(mtick.PercentFormatter(100))
    plt.title("year of "+str(y))
    ax2=ax1.twinx()
    ax2.plot(g.month,g.volume_increase,color="r",label="volume")
    ax2.legend(loc="upper right")
    plt.ylabel("avg volume increase")
    plt.gca().yaxis.set_major_formatter(mtick.PercentFormatter(100))

    plt.show()
```


year of 2015


year of 2016

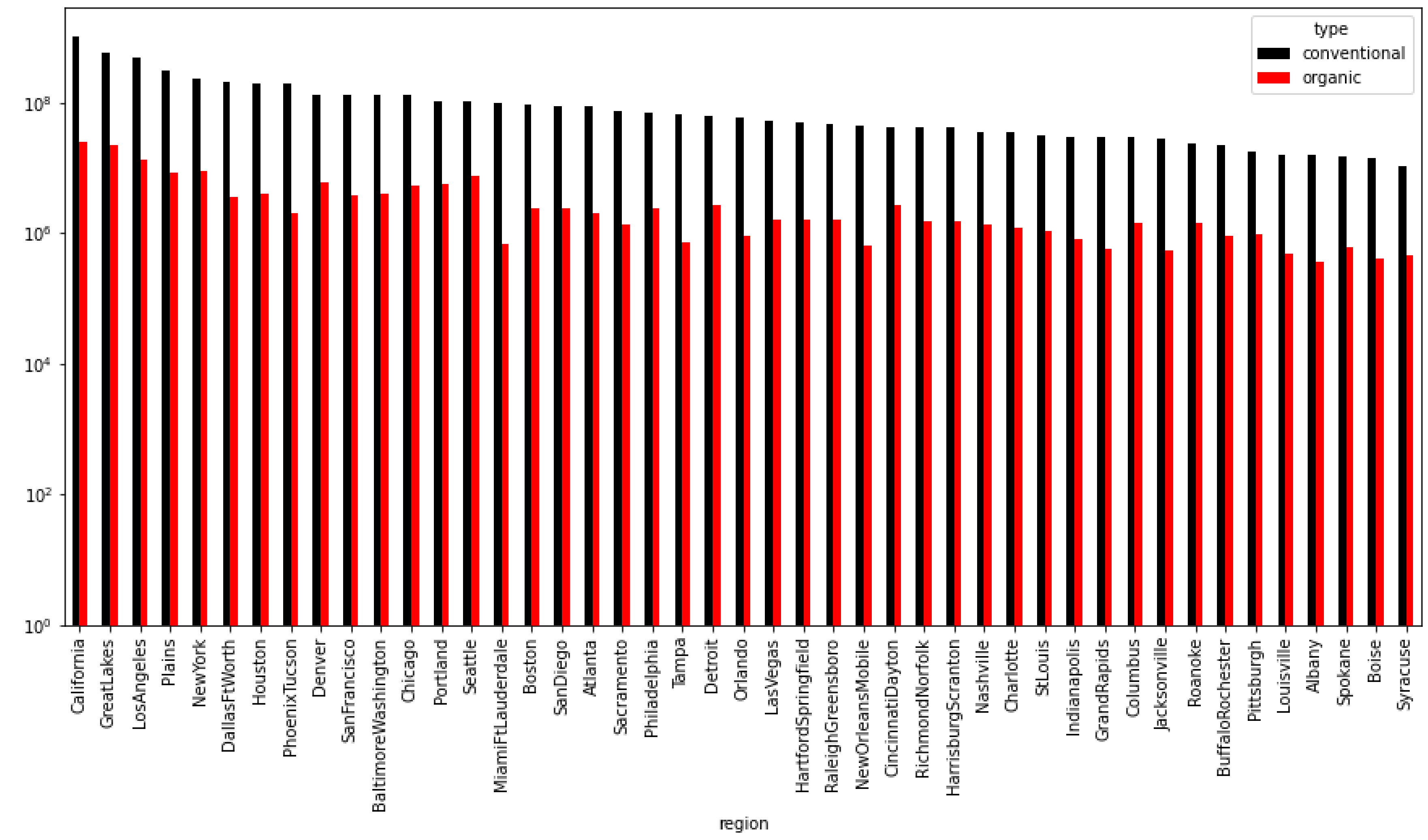

year of 2017


year of 2018

compare total volume of conventional and organic avocados

In [171]:

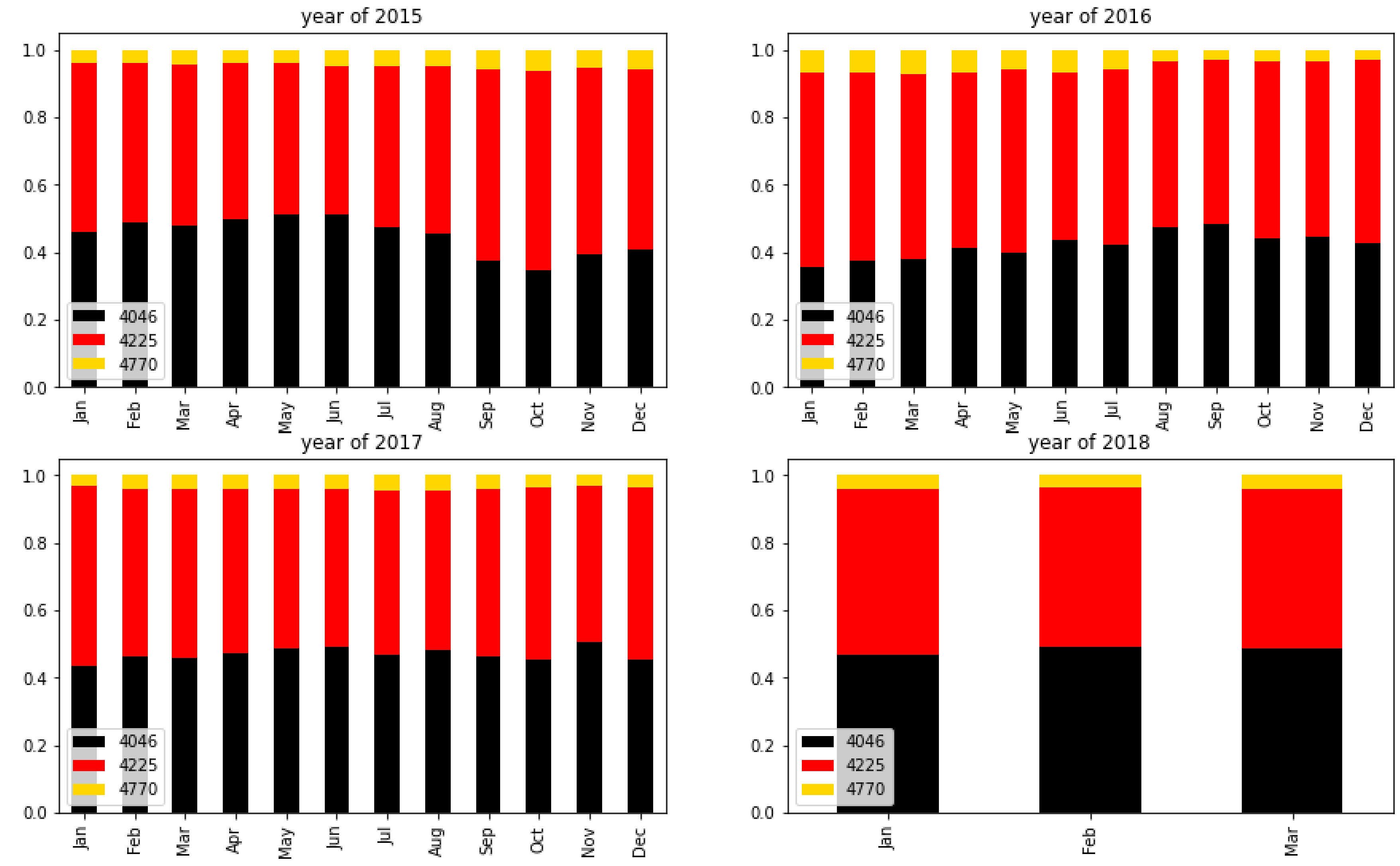
```
g=df.groupby(["type","region"])["totalvolume"].sum().reset_index()
g=g[g.region.str.contains("total|west|east|south|north",regex=True,case=False)==False]
p=g.pivot("region","type","totalvolume").reset_index()
p["total"]=p.organic+p.conventional
p=p.sort_values("total",ascending=False)
p["organic_percent"]=(p.organic/(p.conventional+p.organic)*100).round(1)
p.plot(kind="bar",x="region",y=["conventional","organic"],figsize=(15,7),log=True,color=["k","r"])
plt.show()
```



plot the comparision between sold avocado sizes(4046,4225,4770)

In [172]:

```
fig,axes=plt.subplots(2,2,figsize=(15,9))
for ax,y in zip(axes.ravel(),sorted(df.year.unique())):
    grouped=df[df.year==y].groupby(["month","monthnum"]).agg({"4046":"sum","4225":"sum","4770":"sum"}).reset_index().sort_values("monthnum")
    grouped.iloc[:,2:]=grouped.iloc[:,2:].div(grouped.iloc[:,2:].sum(axis=1), axis=0) #normalize rows
    grouped.plot(kind="bar",stacked=True,ax=ax,x="month",y=grouped.columns[2:],title=("year of "+str(y)),xlabel="",color=["k","r","gold"])
plt.show()
```


year of 2015
year of 2016
year of 2017
year of 2018
■ 4046
🟥 4225
🟨 4770
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec