Bee Farms Large and Small Yields Decrease over the Years

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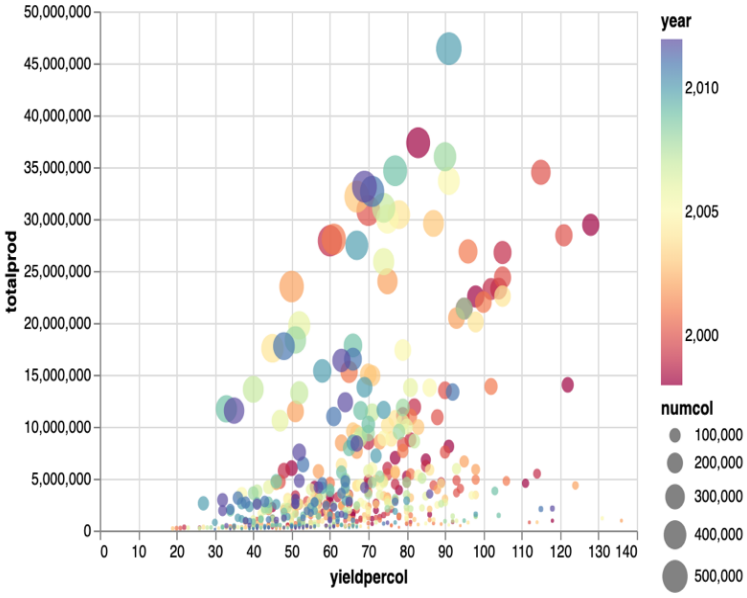
ABSTRACT

For this project I wanted to know if large and small farms had different honey yields per colony, and how that changed over time. I also wanted to see if the price had any factor into determining the difference between large and small farms. So, I made a chart showing the difference between large and small farms by setting total production on the y axis and yield per col on the x axis. I found that honey yields seem to be getting smaller, especially in midsized farms.

Another sign of size I used to differentiate between large and small farms was the number of colonies, which was more helpful in the second graph as I replaced total production with price per lb to find the relationship between price and size, and price and yields. Price and yield had no clear correlation, but there was some grouping where the yields would be lower typically if the price was higher. Also, all of the higher priced honey was on smaller farms. Lastly, the graph clearly shows that as time goes on, the yields are getting smaller, with a clear drop-off starting in 2010.

1 INTRODUCTION

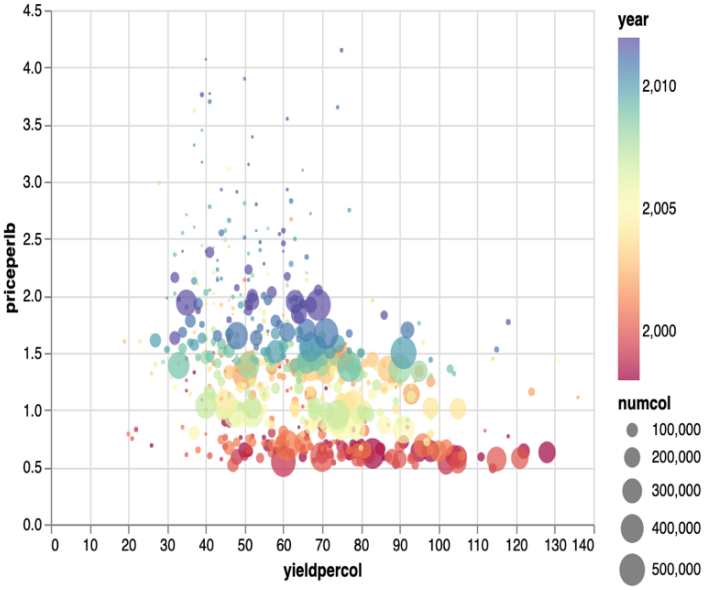
We all know that bees help farms, but what about helping bee farms? I decided to analyse production by bee colonies instead of the produce farm data because I found it more interesting, and the data was easy to find/use. I found that instead of finding the differences between large and small farms, I could find the difference between small and large bee farms in particular as the data is more concise/focused. Also, I could find how the changes in honey production have changed over time, which is an interesting area as it helps to visualize the effects of climate change and other factors like pesticides on the bee population that we hear about all the time. Destroying bee populations can have devasting affects like famine and widespread death due to the lack of pollinators, which are essentially to plant life. This data is from the US in particular.



1.1 Artifact and Discussion One

It appears that the yields per colony, a measure for how well each colony does, seems to be decreasing as time goes on (brighter colors on the right). There does not seems to be a clear indication as to whether the size of the farm affects the yields, although larger farms seem to lean more towards higher yields. There is a clear positive correlation between the number of colonies and the amount of honey produced (which makes sense). Most interestingly I think, I found that yields seem to be getting smaller, especially in midsized farms.

Figure 2: As time passes, prices increase but yields and number of colonies decreases.



1.2 Artifact and Discussion Two

This vis is also very useful, as it helps to determine if larger farms are able to sell their honey for lower prices, and it seems that at least recently this is the case. This makes sense as larger farms are able to have subsidies and more types of equipment to make their production more efficient and less costly. Also, there is no surprise when it comes to the price of the honey compared the year, as one would expect the price to gradually increase simply do to inflation, there could be other reasons as well, but since there does not appear to be any spikes between years it is hard to tell if the prices increased more than just due to inflation (maybe a shortage of bees could have caused higher prices due to supply and demand). Also, as time

goes on, the yields are getting smaller, with a clear drop-off starting in 2010. This is true for the number of colonies as well.

2 Description

I decided to make the dots for my graphs depend on the number of colonies, or the size, to better represent the farms visually in addition to making the graphs cleaner (some of the dots overlapped before the dots were different sizes). Also, using colors to signal the year led for a more detailed understanding of the effect of climate change and pesticides on bee populations and yields. By making more recent years darker, and earlier years brighter, there is a clearer discrepancy between years for bee yields and numbers.

Related Works

2.1 Related Works

The article "Small vs. large: Which size farm is better for the planet?" by the Washington Post talks about the differences between large vs small farms, and how small farms are better for the environment but less efficient on average [3]. This means that even though large-scale farms are more profitable and efficient, having more small-scale farms and finding ways to make they more profitable might be in our best interests.

From the USDA article "Small Farms, Big Differences" I found that a lot of small farms rely on off-farm money, but that small farms can still make money and be profitable which I did not know [5]. Also, it defines small farms as making less than $250,000 a year, an important point as many small-scale farms probably struggle to earn that much based off of other sources. It also states that the number of small commercial farms declined, meaning that people who are actually farmers, and not just hobby farmers, are struggling to compete with larger farms who have access to subsidies and more efficient production through large farm equipment and automation. But the ones that relied on off farm income rose the number of small farms between 2002 and 2007, which means that prospective farmers might think twice before trying to become farmers as an occupation.

The book *The Market Gardener* details how it is possible to make a profitable business from farming an extremely small amount of land [2]. This was fascinating because I always thought you needed lots of land and equipment to farm profitably. It details the amount of careful planning and consideration that must be put into the organization of your farm if you hope to be profitable on a small farm. The amount of time you spend not actually farming is minimized, and the possibility of making it a regular 9-5 job for 9 months and having a 3-month vacation is nice to hear for potential farmers. However, there are several factors that determine whether or not this can work, including the necessity of having a cover crops, using no-till to preserve soil biodiversity, rotating crops on a clear order and timeline, and having a guaranteed market for selling your crops. Regardless, all of these things (except for a guaranteed customer base) lead to good farming practices overall with help to sequester carbon and make a farm sustainable. The author's one fallback is his dependency on buying compost, but market farmers are known to do this as it decreases costs overall as one does not have to rely on their own compost creation which takes time away from farming and leads to lower profits overall.

Jean-Martin Fortier, the market farmer the book details the success of, bio-intensively farms in the cold region of Quebec using greenhouses and other covering technologies. However, he keeps his emissions low by not using a tractor and by weeding and harvesting by hand. Many may think this is a lot of work, but due to the nature of bio-intensive farming, the crops are grown so close together and the soil is so nutrient that the weeding takes significantly less time and effort than other types of farming. It also allows for farming only insanely small plots of land, which means that farming can be more accessible even to those who live in the city. This is good, as living in or near a major metropolitan area is makes it much easier to find customers for their produce so that farmers can ensure they make a living off their farming alone.

The article "'Like sending bees to war': the deadly truth behind your almond milk obsession" by the guardian tells a story of how bees sent to pollinate industrial almond farms in California are dying at record rates [4]. This is another reason that large scale farms are bad for the environment and ecosystem, and something to look for in my data. While there are obvious pros for the use of large-scale farming, most would argue that small-farms are better for the ecosystem and, combined with knowledge from market farmers, can lead to higher employment overall.

The Study "Partial shading by solar panels delays bloom, increases floral abundance during the late-season for pollinators in a dryland, agrivoltaic ecosystem" found that there is a benefit to using bees and solar panels together that led to greater biodiversity [7]. While fully shaded areas harmed bees, when areas were partially shaded bees were unaffected or even better off. This means there is hope in the future for having renewable energy and bees if we want to protect the environment, as long as solar panels are used right.

"Unique Bee Communities within Vacant Lots and Urban Farms Result from Variation in Surrounding Urbanization Intensity" found that open spaces in parks play an important role in the urban bee farms [8].

"Redundancy in wildflower strip species helps support spatiotemporal variation in wild bee communities on diversified farms" details the importance of wildflower strips to the support of bees and other pollinators [1]. Bees need wildflowers, and having enough of certain types of wildflowers ensures that bees are healthy. It also talks about how bees can help in the aid of farms, and there can be farms of bees too.

References

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