Earth Common Journal
Synthesis—Uniting Health, Nutrition, and Earth
MacEwan University
Volume 7, Number 1, October 2017

Article

Harvesting Urban Honey with Modern Technology

Troy Donovan*

Abstract

This article looks at the new beekeeping technology of the Flow frame and how it benefits Urban Beekeepers. In spite of negative preconceived notions about new technology, the article compares the time, space, and energy requirements of the new technology as compared to the old technology. What makes a successful honey harvest is also discussed, along with how more people nearby can make the harvest easier and harder to manage.

Introduction

Beekeeping technology changed in 1851 with a new Langstroth hive, which introduced the use of *frames* – large wooden panels inside the hive, where bees store their honey in beeswax honeycombs (Langstroth, 2015, p. 21). These frames were movable, allowing for the whole frame to be removed from the hive and the honey to be extracted. Fourteen years later the centrifugal extractor was invented to fling honey off the frames (Crane, 1999, p. 22) for harvesting. The technology improved a little with this invention but did not change until 2015 when a new flow hive was invented with frames allowing honey extraction, right from the back of the hive with the bees still inside. It became a worldwide phenomenon. Harvesting honey required less time and space than all previous technology.

The purpose of this study is to investigate the effects of changes to beekeeping technology within the past five years.

This study aimed to answer two questions:

1. Does modern technology accomplish better results and encourage better bee husbandry?

2. Can downtown urban beekeeping produce a successful honey harvest?

Beekeeping Technology

In the last five years, one of the most significant changes to technology was the Flow Hive, which posed some critical questions of the beekeeping industry. The Flow Hive, which was a 2015 worldwide crowdfunded phenomenon, had over 9000 people donate money in support of the new technology and raised 4.2 million dollars. Initially, the father and son team, Stu and Cedar Anderson, calculated that they would only need $100,000 to get the concept out of the idea stage and into production. They achieve that goal in 477 seconds. It was successful but what was it?

The new Flow hive came with new Flow frame technology. The Flow frames are what replaced normal Langstroth frames in hive boxes where only honey was kept. The Flow frames look like thick Langstroth frames that have already been filled in with wax honeycomb.

> The clear viewing ends of the frames, as well as the honey tube and caps, are made from virgin food grade copolyester. The manufacturers have assured us that it's

> not only BPA-free, but it is not manufactured with bisphenol-S or any other bisphenol compounds. The manufacturers also advise that third-party labs have tested this material and the results have demonstrated that it is free of estrogenic and androgenic activity. The centre frame parts are made from a virgin food grade polypropylene, which is also free from any bisphenol compounds and is widely accepted as one of the safest plastics for food contact. Plastics have been used for many years in beehives for both brood and honey combs and have not been found to have a negative impact on bee colonies. ("Flow Frames BPA", 2017, para. 1-3)

Each row of cells is formed of two halves, one of which is movable (Figure 1). The half that moves only moves by half the width of the cell, as shown in Figure 1, by the cells on the left. After being moved, they form a channel to the bottom of the frame. At the bottom of the frame is a closed hollow tube that can open at one end. This opening is at the back of the hive. The core idea was to crack or move the cells apart to form the channel. The honey would flow down the newly formed channel of cells, down into the opening, and then out the back of the frame, usually into a waiting honey jar. Once the honey is drained, the cells are moved back into the normal position and the bees are able to start filling the gaps and preparing to store more honey.

Figure 1. A Flow frame, cells along the left hand side partially moved to the open position.
Photo by Troy Donovan. Copyright 2016 by MacEwan University.

So many people were excited about the new Flow hive idea that the sheer volume of times it was brought up was getting annoying. Maryam Henein from the Honey Colony website wrote a post saying, "Frankly, I

am tired of people raving about how wonderful the Flow Hive invention is and posting it on my Facebook wall every other day" (Henein, 2017, para. 2).

Some beekeeper websites even banned discussion about the Flow Hive because it was dominating all their other discussion forums, which normally only discussed traditional ways of beekeeping. With so much attention from crowdfunding, there was the inevitable controversy and concern that followed. One concern was how bees would respond to the plastic used to make the Flow frames. Jonathan Powell posted, "In my experience, bees hate plastic comb and they use it when there is no other option. You will often see bees build wax comb on top of plastic wax comb if they are given the space opportunity. They will hate capped empty plastic comb even more" (Powell, 2017, para. 3).

Powell failed to mention that plastic is only used as a backing material for structural purposes by the bees—same way they would use wood or any other structure. Before the bees store honey, they fill the gaps and coat the inside of the cell with beeswax. Frames, in general, are made from both wood and plastic. If you buy plastic frames, the plastic middle piece, called foundation, is textured to the honeycomb shape with a low profile. The foundation is then almost always dipped in a thin layer of beeswax by the beekeeper. Wooden frames with a plastic foundation are even more common. Bees happily accept plastic that has a nice smell of beeswax on it. The Flow frames are readily accepted when they are started with a thin layer of beeswax as well. Once the bees start using the Flow hive they readily keep using it. With the honeycomb shape of the Flow hive being the correct size, the bees simply add a few topcoats of wax then fill it with honey and finally put a wax cap on each cell. If bees hate something in their hive they will remove it or bury it in wax or propolis — a resinous mixture of bee secretions, wax, and exudate gathered from botanical sources (propolis, n.d.)—and not touch it.

Another beneficial result of a beekeeper using modern technology is how much less space is needed for all the equipment throughout the year. Using a standard Langstroth hive, each colony of bees requires at least one or two "brood" boxes all year round but those can stay in the bee yard (apiary). The boxes added on top of the brood boxes are only added as needed and can go a high as nine more boxes high for each colony! In winter all those boxes and the frames have to be stored somewhere and that can take up a lot of space. There is also the extraction room for processing the honey crop, which can be your kitchen for only a few hives but averages 3.0 sq. ft./colony (Hoopingarner & Sanford, 1990, pp. 405-407). One hundred hives are 300 square feet of space.

In contrast, the Flow hive has the same number of brood boxes but only one box from each colony needs to be put into storage. When it comes to cleaning up after a honey harvest, it requires even more resources, as mentioned by James Tew: "The availability of hot and cold water for clean-up and well-lighted work area add greatly to the efficiency of the smaller operation. Since honey spills are almost inevitable, a tile or linoleum floor surface is desirable" (as cited in Langstroth, 2015, p. 535). In contrast, the Flow frames stay in the hive and the bees happily clean up any honey that does not get harvested. From experience harvesting many Flow frames, as a beekeeper, I found it is necessary to only crack open a quarter of each frame at a time to ensure the majority of the honey gets harvested.

Most critics of the new Flow hive technology also lack a basic understanding of it. "Even some beekeepers of holistic repute either endorse the Flow Hive or sit on the fence, completely failing to see that it is not simply the invention per se that is to be deplored, it is the mindset of casual exploitation that is behind it. We are told that we can surreptitiously steal the precious winter food of the Bee without even bothering to interact with that wonderful creature. This is unthinking consumerism at its worst" ("The Flow hive", 2015, para. 1).

While some holistic beekeepers endorse the Flow hive, the idea that some form of exploitation is occurring is not true. All new beekeepers understand that getting the honey requires looking after the bees. Any casual approach results in less honey or just a dead colony. The Flow hive only exists as a much-improved method of harvest. Almost all other aspects remain the same for the beekeeper. If a beekeeper is successful, they embark on a mutually beneficial relationship with the colony of bees.

The Bee Act of Alberta recognizes the role of beekeeper. According to 1e of the Bee Act of Alberta, you are a beekeeper if you are "a person who owns and possesses bees or beekeeping equipment or both" (Bee Act, 2000). As a beekeeper, you are also required to be aware of and be in control of any bee diseases. The list of what is considered a bee disease is well defined in the Bee Regulations website (Bee Regulation, 2003). If the beekeeper does not properly register and report issues, then sadly, the bees can be destroyed: "If the Provincial Apiculturist has evidence that a bee disease or Africanized bees are present in any bees or beekeeping equipment, the Provincial Apiculturist may, by written order, direct that the beekeeper destroy the bees and the beekeeping equipment' (Bee Act, 2000).

Subsequently, it is better to be a proper beekeeper and learn to interact with the wonderful creatures. There are many benefits to the bees but mostly they have a much

stronger chance of making it through the winter. There is also the benefit of a properly fed colony in the spring, which grows strong and healthy thanks to the beekeeper. A strong colony, more prepared than it could be on its own, has many more forager bees to bring flower nectar back to the colony. It is irresponsible to own a colony of bees without properly looking after them and is actually not allowed. You cannot look after a colony of bees if you do not inspect the colony and manage any bee diseases found.

Better Results, Better Bees

Urban beekeeping is all about the location. The location of an Apiary, where the beehives are located, is a very important decision for a beekeeper if they want to have a successful harvest year after year. As Figure 2 shows, access to urban apiaries can be tricky because of locations on rooftops or behind locked gates, but they are often very close to home.

Roger Hoopingarner and Malcolm Sanford in *The Hive and the Honey-bee* said, "Certainly, the apiary site needs good vehicle access throughout the season" (Langstroth, 2015, p. 578). The new technology of the Flow hive prevents the need for a vehicle because transporting boxes and boxes of frames to and from the apiary is no longer necessary, especially during harvest season when the boxes get very heavy. This translates into the benefit of allowing an apiary to be located in harder to reach places like on a roof with limited access.

In the same article, Hoopingarner also says, "Labor is the backbone of any beekeeping operation. Many beekeepers get away with inexpensive labor because family members are involved" (Langstroth, 2015, p. 578). With the amount of time saved because of the harvesting efficiency of a Flow hive and nearby location of an urban apiary, the backbone of the operation is much less demanding. A trip to the apiary can be included with other errands around the city. Even the beekeeper's need to have family members is not as important, as so many other nearby friends and individuals are close enough to help. Without the Flow hive, labourers are very important during harvest season because of the need to lift heavy hive boxes to transport them away from the apiary to the extraction location. Every beekeeper I talk to tells me how important it is to have a healthy back. It was true that if you did not have a strong back that you could not take care of bees—until the Flow hive came along.

Hoopingarner also goes on to say, "Urbanization of agricultural areas means fewer beekeeping locations. Residents taking advantage of amenities in rural settings are not necessarily sympathetic to those who grow the nation's food supply" (Langstroth, 2015,

p. 579). I agree that a hive in a field or park where residents might run into it or even vandalize it would be a significant problem. The exception is the new Flow hive technology where a secure rooftop location right near or in the park becomes a much more viable option. On a sunny day within touching distance of a hive on the roof, bees are plentiful and defensive. In contrast, the MacEwan groundskeepers taking care of the flowers and plants below the hives, at ground level, talk about having to look closely to see the bees.

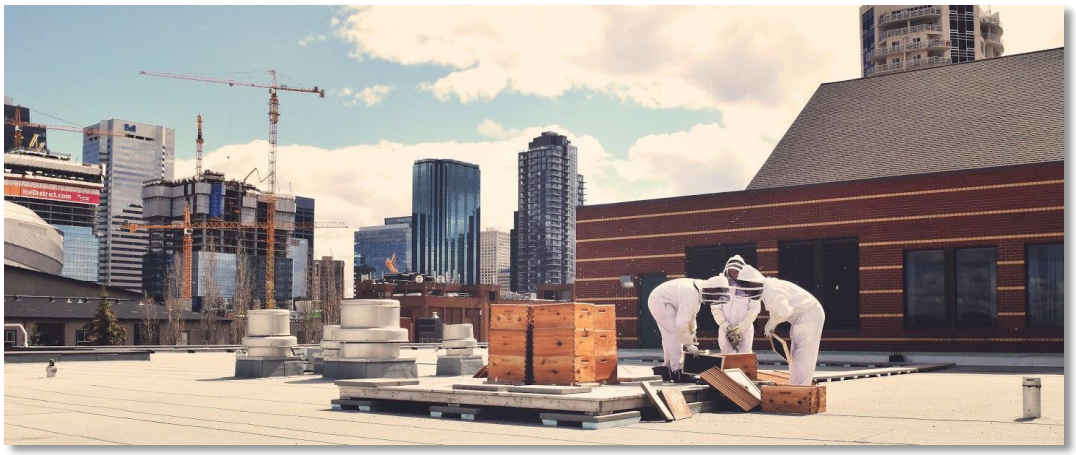

Figure 2. Four hives being readied for winter on the roof of the MacEwan University 3rd level of Building 5. The windows are classrooms and there is one door for access.

Rooftop hives have been located in many big cities for decades including Paris, New York, and Hong Kong (Our Story, 2017, para. 3). Even without the Flow frame technology, there are people who have made it work. As Luke Dixon says: "It was clear that if you have a room for a composter or a water barrel, you have room for a beehive" (Dixon, 2012, p. 12). Although I agree with this, there is a lot more consideration than just where the hive itself can go, such as where to keep all extra hive boxes and where to extract the honey. To be successful. the amount of surrounding greenery must be considered and if a water source will be provided near the bees. Bees have been known to find a nearby kiddie pool if they do not have a better source—even chlorinated pools. Chlorine is a form of iodized salt, which the bees like. At MacEwan they use pickled gravel (salty gravel) to melt ice on sidewalks during the winter. The pile leftover from winter was a favourite spot for the bees during hot weather. At least, until I provided a better source of pickled gravel closer to the hives. Lesson learned.

When bees are making honey they normally forage for nectar, put it into the cells, dry it from 80% to less than 18% humidity (Langstroth, 2015, p. 676) and then put a cap or thin wax covering over the cell. When the cells were cracked in the Flow frame, the cap would wrinkle but the bees would continue walking on that surface while the honey was being extracted. Honey could be harvested without even opening the hive and because the honey came out the back of the hive the natural foraging process of the bees would remain undisturbed at the front. Only the wasps in late June would hassle the beekeeper and with the jar being properly covered the wasps are not able to get into the honey. A beekeeper needs to carefully manage a hive when the bees are bringing in lots of nectar.

The honey flow, as it is called (Langstroth, 2015, p. 299), can cause swarming problems if there is not enough space for the bees to store the nectar as it is dried out from 80% to the proper 17% humidity levels. With the flow hives, it was possible to harvest the honey as soon as it was ready which gave the bees more space to work with, as they needed it.

The amount of honey produced relies on the quantity of nectar available and how many forager bees are available to bring it back to the hive. The bees will store it anywhere they can find cells to store in. Using normal frames or Flow frames would have no effect on the amount produced. With consistent harvesting and proper management of the space where the queen lays her eggs, the bees continue to use the Flow frames again and again.

Conclusion

Modern technology allows for better results by saving time, space, and the energy of heaving lifting. Extra time for the beekeepers allows them to be better prepared and allows them more time to work on their mutually beneficial relationship. The extra space saved by using newer technology such as the Flow frame does allow for more people to get into beekeeping in more locations. This is by no means unique to Flow hives as tight spaces have been used in many cities around the world for much more than the last 5 years. People with physical limitations to becoming beekeepers will definitely have better results with the option of using a Flow hive. Increased interest and discussion worldwide about how to take better care of bees will always have a positive effect on better bee husbandry—at least to the point it becomes annoying on Facebook.

A successful honey harvest can definitely be achieved by downtown urban beekeepers if proper preparations are in place. Ensuring a water source and green space such as gardens, parks or a river valley are nearby can help with the success. With vandalism in mind, the location is important to consider, but rooftops, backyards or

anywhere a rain barrel could go are considered the best locations for a hive. Having so many people nearby means you have to keep on top of swarming and colony management but it also means that help will be more readily available. The Flow hive technology with so little need for vehicle transportation or storage space is an ideal situation and allows for success in many more locations.

**Author: Troy has a Bachelor of Science in Electronic Engineering Technology and is the Learning Systems Application Administrator for MacEwan University's E-learning office. He has even become vaguely Edmonton-famous as MacEwan's Urban Beekeeper. Troy is more of a listener but he does reluctantly admit that, "Yeah, I've done some stuff." While he might usually be on the receiving end of a good story, Troy certainly has many stories of his own worth telling—stories that include traveling the world, scuba diving, triathlons, toastmasters, an elaborate marriage proposal, and stories from raising a family of three kids.*

References

Are the Flow Frames made from BPA free plastic? (2017, October 13). Retrieved October 27, 2017, from https://www.honeyflow.com/faqs/all/are-the-flow-frames-made-from-bpa-free-plastic/p/57

Bee Act, Province of Alberta (2000, c. B-2). Retrieved from the Queen's Printer website: http://www.qp.alberta.ca/documents/Acts/B02.pdf

Bee Regulation, Province of Alberta (2003, 194). Retrieved from the Queen's Printer website: http://www.qp.alberta.ca/documents/Regs/2003_194.pdf

Crane, E. (1999). *The world history of beekeeping and honey hunting*. NY, New York: Routledge.

Dixon, L. (2012). *Keeping bees in towns and cities*. Portland, OR: Timber Press.

Henein, Maryam. (2017). 3 Reasons To Go Against The Flow Hive. Retrieved October 23, 2017, from https://www.honeycolony.com/article/against-flow-hive/

Hoopingarner, R. A., & Sanford, M.T. (1990). The costs of beekeeping. I. Survey of commercial beekeepers. *American Bee Journal. 130*(6), 405-407. Retrieved from http://americanbeejournal.com

Langstroth, L. L. (2015). *The Hive and the Honey Bee*. Hamilton, IL: Dadant & Sons. (Original work published 1853).

Our Story. (2017). Retrieved December 3, 2017, from https://www.rooftophoney.com.au

Powell, Jonathan. (2015, February 25). Thoughts on the flow hive [Blog post]. Retrieved October 23, 2017, from http://www.beeswing.net/2015/02/thoughts-on-flow-hive.html

Propolis. (n.d.). In *Merriam-Webster's online dictionary*. Retrieved from

The Flow Hive. (2015, February 24). Retrieved October 20, 2017, from http://www.naturalbeekeepingtrust.org/single-post/2015/02/24/The-Flow-Hive