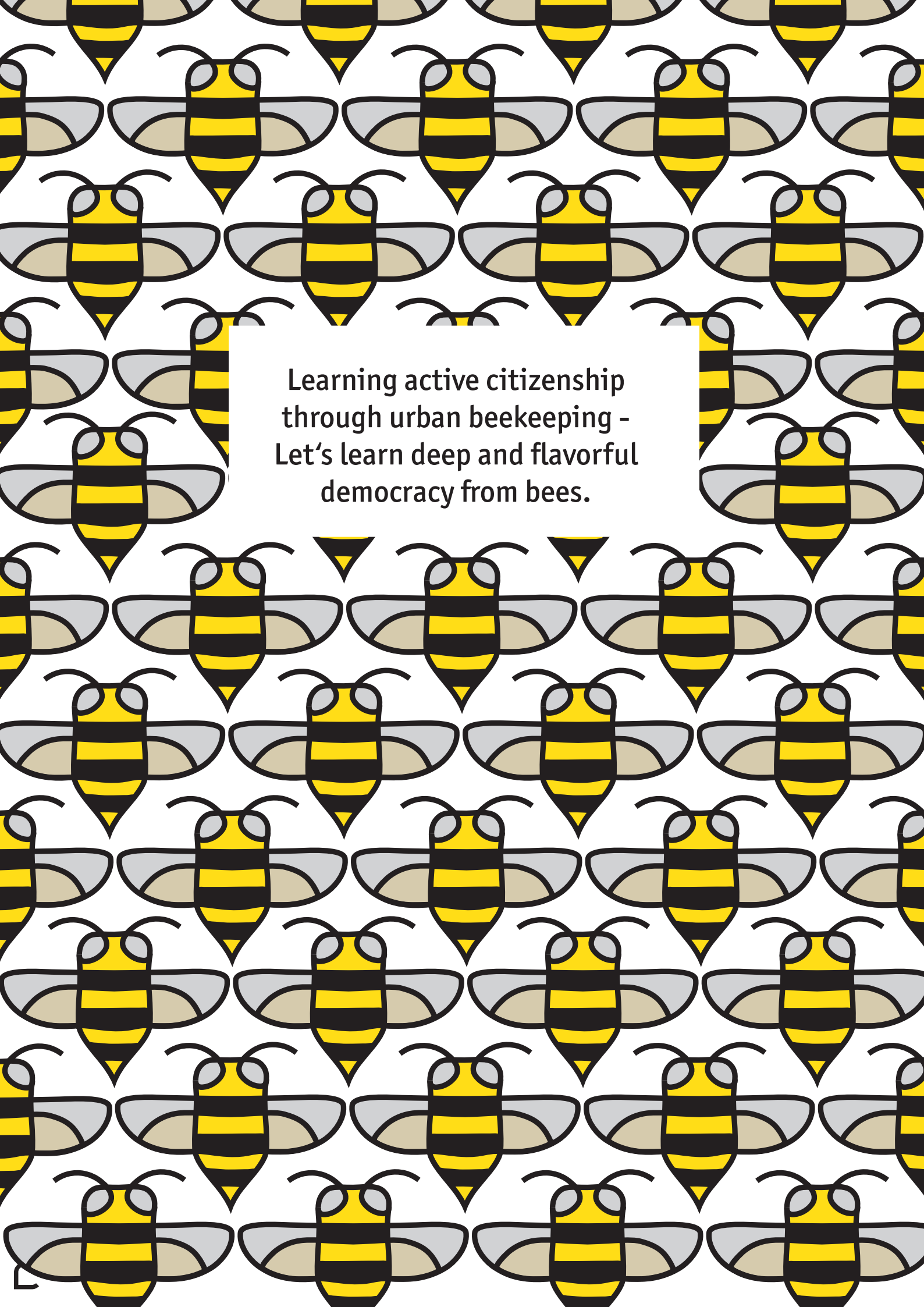




HUMANS & BEES

WHAT CAN WE LEARN FROM BEES

Guide for the prospective beekeeper



Learning active citizenship
through urban beekeeping -
Let's learn deep and flavorful
democracy from bees.



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And now you ask in your heart, „How shall we distinguish that which is good in pleasure from that which is not good?“
Go to your fields and your gardens, and you shall learn that it is the pleasure of the bee to gather honey of the flower.
But it is also the pleasure of the flower to yield its honey to the bee.
For to the bee a flower is a fountain of life,
And to the flower a bee is a messenger of love,
And to both, bee and flower, the giving and the receiving of pleasure is a need and an ecstasy.

written by Kahlil Gibran, a Lebanese poet (1883 - 1931)



Photo by Aaron Burden on Unsplash

LEARNING FROM BEES

1. COMMUNICATE ON MANY LEVELS

If you find yourself feeling misunderstood, perhaps it's time to consider the humble bee. They know how to get a message across. Bees are deeply engaged with each other and share information from the outside world with depth and complexity. They can use their bodies to send messages to fellow bees and can also communicate visually, or with sound and vibrations.

2. GIVE MONOTASKING A TRY

Have a massive to-do list? Forget multitasking. As true masters of efficiency, bees do many things during a lifetime — but they do them one at a time. So when you feel overworked, think of the bees and try to focus on only the top priority.

3. TRUST THE HIVE

Whether you are running a business, or simply trying to make an important decision — think like a bee and consult the group. According to Winston, bees evaluate information to make good decisions by crowd-sourcing. In fact, Winston says bees actually thrive by relying on decentralized and collective decision-making.

4. TAKE TIME TO REST, 'BUSY AS A BEE' IS A MYTH

According to Winston, it was Chaucer who first used „busy as a bee“ in The Canterbury Tales during the late 1300s. But Chaucer was simply waxing poetic. In fact, bees spend more of their time resting than working. They spend two-thirds of their time doing nothing. Winston knows this from labeling and watching bees for hours! So, make like a bee and stop to smell the flowers. (Book: „Bee Time“ by Mark Winston)

HONEY BEES & HUMAN BEINGS

The honey-bee is one of our **best known insects**, whose relationship with humans can be traced back to the dawn of humankind when early people 'stole' honey from wild bee nests. Cave paintings in Spain from as long ago as 6000 bc show our ancestors taking honey from bees.

Honeybees, with a brain of only 960,000 neurons, are capable of a surprising degree of **higher cognitive function**, including the ability to cope with the *concept of 'sameness', recognize human faces, use top-down visual processing, balance conflicting speed accuracy demands in task allocation, solve complex maze-type problems and show context-dependent learning and to use a symbolic dance system to communicate with conspecifics.*

The evolutionary symbiotic relationship between honey bees and flowers is probably the most important reason why our world looks like it does today, if bees and other pollinating insects were to be wiped out, humans and other animals would not last for long.

Food for free? If you look at fields full of flowering crops or wild flowers in the countryside, or at garden and park flowers in the cities, you are not only looking at beauty but also at gold – thousands of tons of valuable honey. Liquid gold sitting there, all for you!

If you don't go and get it, the flowers will die at the end of the season and all those tons of honey will go to waste. All that money will simply have dried up in front of your eyes. If, on the other hand, you have bees, they will go and get it for you for free, and you can then either eat it or sell it or both.

THE BEE FAMILIES

Understanding the honey bee colony

The colonial organization of honeybees reveals numerous analogies to multicellular organisms which makes it tempting to use the term superorganism. The sterile workers fulfill the role of the somatic cells in organisms with intricate and complex interactions. These interactions are under partial control of hierarchical signals (pheromones) which are primarily used for global information of the colony. The majority of the activities in the colony is, however, regulated through local decision making and through self-organized processes which are regulated through worker threshold response variability. In honeybees this is enhanced through the highly polyandrous mating system which allows for wide genotypic variance and the presence of genetic specialists.

A single honey-bee cannot live for very long on its own. There would be no point in doing so. A worker bee cannot reproduce; a queen bee cannot construct comb, collect food or even feed herself; and a drone bee is able to accomplish only one task and that is to mate. All three castes of honey-bee that live in a colony of bees – the queen, the worker and the drone – therefore can live only as part of a colony. The colony is in effect the organism, with the individual bees acting as the cells that make up that organism. In order to keep bees successfully, the beekeeper has to understand that organism: how and why it works and what it needs for its survival. Only then can the beekeeper work with bees, adapting his or her requirements to theirs. You can't direct bees, but you can encourage them to work your way – to a certain extent.

Each type of bee begins life as a small egg laid by the queen in the base of a wax cell in the comb. After three days, the egg hatches and the bee begins its larval phase in an open cell, being fed by nurse bees first on royal jelly and then on a mixture of pollen and honey (unless they are destined to be a queen bee, when royal jelly will be fed continuously). After another five days, (six for a drone bee), the workers cap the cell, and the larva spin a cocoon around itself and begins its pupal stage during which it gradually changes into an adult bee. The bee then chews through the capping of wax and emerges as an adult. This means, of course, that every bee you see is an adult.



Photo by Eric Ward on Unsplash



Recognizing drones

The **drone** is a very specialized animal indeed. He is a big, burly bee, and most novice beekeepers mistake drones for the queen. He is easily distinguished, however, because of his **blunt abdomen and huge eyes**, which cover most of his head. He has no sting and can be handled safely. This fact often leads even mature beekeepers to show off in front of non-beekeepers, and small children have been known to trick their teachers by presenting them with a handful of buzzing drones.

The **drone congregation area (DCA)**, is where the virgin queens mate on the wing with up to 20–30 drone bees, but usually fewer DCAs are mysterious affairs, and much scientific research has gone into trying to find out why they are where they are and exactly what their boundaries are. It still reappears in the same place each year and can easily be heard on a fine summer's day. In these DCAs, **drones mate with a queen**. If they pass an invisible boundary inches away, they won't. *Why not? How do drones, which are new each year, know where they are? How do virgin queens know where they are?*

Worker bees

The **worker** is an **incomplete female** in that she **can't mate and reproduce**, but she does **just about everything else** and, if you see a honey bee collecting nectar and pollen from flowers, it will be a worker. Worker bees pass through various task-related phases as they age. Unlike ants, for example, which have task-related castes (such as soldier ants for defence and so on), honey-bee workers engage in defence or other duties at certain ages. Workers can synthesize the sugars in nectar and honey into beeswax, which they extrude through glands underneath their abdomens. Each worker has four 'wax mirrors' from which wax is extruded. Wax is employed to build comb that is used as a nursery for brood, as a store for pollen, a store for honey and as a surface on which to live in the hive. In other words, wax is central to the bees' existence. Without it, no food can be stored, no eggs could be laid and no brood reared. The colony would soon die out. Bees are such efficient pollinators because, as forager bees, they can communicate the source of food to each other. Immediately on setting up as a colony, scout bees are out looking for the nearest and best sources of nectar and pollen. When they find these, they return to the nest with samples and tell the other foragers about the location and how to get there using a highly symbolic dance language based on movement and sound.





Credit: Photo by Massimiliano Latella on Unsplash

Bee dance

The bee dance is a **unique communication system** about **remote spatial locations**, and it is not known to exist in any other animal species in such an advanced form. The communication process involves multiple forms of learning both by the recruited bee and the dancer. The recruited bee learns the odour on the body of the dancer from the indicated food source, and as it may have experienced the same odour during its foraging the activation of the respective memory will also guide it to the formerly visited place.

Under such conditions the recruit will attend the dance only for a short period collecting less information about the spatial parameters, and leaves the hive for inspection of its former forage. If the dancer does not communicate any odour from the indicated goal and recruits attend the dance for multiple rounds it learns the spatial parameters of the goal, and this message is not just about the flight vector towards the goal but also indicates the dance-communicated place in spatial relation to those places learned by the recruit before. This allows the recruits to make decisions according to their own experience in the environment. The bee will fly either directly to the location indicated by the dance, or its formerly visited place. After arriving there it can take a direct shortcut between these two places: that is, the formerly experienced place and the dance indicated place.

Also dancing bees learn about the importance of their communicated location for the colony by the feedback from the recruits. In the context of a swarm they also attend other dances and may send a stop signal to another dancing bee if it advertises for a different nest site that is considered to be less attractive. Genetic variation comes into play: some workers will be more genetically disposed to carrying out this task than others.

Worker bee

The worker bee, therefore, changes her duties according to a time schedule, but the situation is more complex than this. The queen mates with many drones, and so one group of workers will be super-sisters derived from one father, all with a particular genetic make-up, while other workers will be from the same queen but another father with a different genetic make-up.

Workers from the different genetic groups will have different genetically driven dispositions to carry out the myriad tasks in the colony. There may be many different subfamilies in the colony, and this depends on the number of drones the queen mated with. All the workers therefore will have the same mother, but not necessarily the same father. Research has shown that this genetic variation is vital for the efficient working of the hive and is another reason for the queen to mate with so many drones.



The birth of a queen

Worker and queen bees start out exactly the same and that different nutritional regimes cause them to differ markedly. In effect, all fertilized eggs start out as potential queens. After three days of development a change in diet for the majority of them forms the worker bees. The others remain as queens. When the colony requires a new queen – if, for example, the old one dies or becomes old and ineffective in her laying or for other reasons that will become clear later on in the book – the workers begin to construct queen cups, which are cells on the surface of the comb but facing vertically downwards. If they proceed with the plan, the queen lays fertilized eggs into the cups (the same as worker eggs), and the creation of a new queen begins. After 16 days, a queen bee emerges from her very distinctive cell.

If allowed to by the worker bees, the new queen kills off potential rival queens still in sealed cells by stinging them through the cell wall, and then she fights any other virgin queens in the hive that have emerged – again, if allowed to by the workers. Worker bees occasionally keep another virgin in readiness in case the first fails to mate, and they will protect this virgin until they have a mated queen. Replacing a queen If the queen suddenly dies or is removed, there will be no eggs in queen cups to develop into queens. The workers will then choose young larvae under three days old in worker cells that already exist, draw out the cells, feed them as for queens and so produce emergency queens. There is much debate and research on how effective these queens are compared with planned ones, but it is evident that the bees do not always choose the best larvae and that some of these emergency queens are, at best, sufficient.

The whole colony, therefore, lives in a state of dynamic equilibrium, ready to alter or amend its priorities and population ratios at any given time, but only and always for the colony's benefit and survival. The beekeeper can't change any of this but can work with the flow by helping to ensure that external factors, such as lack of shelter, starvation, disease, queen failure and so on, are minimized and remedied swiftly if they do occur.



STARTING BEEKEEPING

WHAT DO YOU NEED?

In order to start beekeeping, you will ideally need the following items.

- **TWO COMPLETE BEEHIVES** (at least)

Use the most locally used, modern-style hive (but not the Layens hive in Spain even if it is the most common). If in doubt use a Langstroth or local equivalent.

- **ONE BROOD BOX (DEEP/FULL)** and **TWO SUPERS (SHALLOWS, ¾ SIZED)** - at least.

Use a queen excluder to start beekeeping and use the frames as advised above. Use **Hoffman frames** in the brood box and **Manley frames** in the honey boxes. Avoid frames that require plastic or metal frame spacers (although, unfortunately, these often come with new hives).

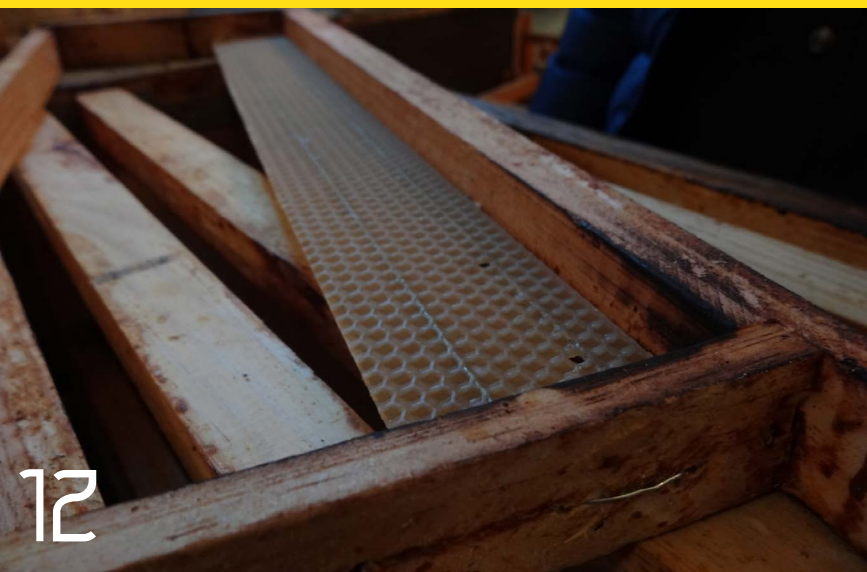
- **STANDARD WAX FOUNDATION** wired into the frames. You may have to do this. Or, preferably, they should be made of plastic and coated with a light film of beeswax.

- **A HIVE TOOL.**

- **A GOOD-SIZED SMOKER.** Make sure this has strong bellows and a protective grid around it.

- **A BEE SUIT WITH A ZIP-UP HOOD/VEIL.**

- **GOOD GLOVES.** Purchase gloves with gauntlets – and also a pair of gumboots.



Beekeeping practice

Best beekeeping practices include maintaining bee colonies in moveable-frame hives that are kept in sound and usable condition; providing a constant and adequate water source; locating hives so that the movement of bees does not become a public nuisance. Beekeepers shall be able to respond immediately to control bee swarms and to remediate nuisance conditions that include, but not be limited to, aggressive or objectionable bee behaviors, hive placement or bee movement that interferes with pedestrian traffic or persons residing on or adjacent to the hive premises; and overcrowded, deceased or abandoned hives.

What type of bees you should choose?

Use a gentle strain if you can obtain them and take advice from local beekeepers as to the best strain for your area. Be careful whom you believe. Use Carniolan, Italian or Cecropian (Greek) bees, especially if you want to keep your bees in an urban area.

A variety of factors may influence how aggressive a colony becomes. As a general rule, established colonies are more aggressive than small nuclei, and so any test of aggression should be made when a nuc grows into a colony. The degree of aggression also depends on the beekeeper's perception. The factors that may influence a colony's aggressive tendencies and possible remedies are listed

How to position your hives?

Some may wonder why on earth a beekeeper would keep bees in a city. In fact, some of the best honey comes from city parks and gardens, and some areas are richer in nectar than many areas of the mono-crop countryside zones. There are three important things to think about in urban areas: neighbours, neighbours and neighbours.

Correct placement of hives is a very important consideration for responsible beekeeping in urban and suburban settings. Renters are especially encouraged to seriously consider the long-term potential of their situations and must obtain owner permission in order to keep bees. Ensure that your hive is in a location that can be accessed regularly, safely, and easily.

Hives should be kept as far away as possible from roads, public sidewalks, and rights of way. Flight paths into the hive (generally ten feet in front of the hive entrance) should remain within the owner's lot, although flyway barriers (e.g., fencing and tall shrubs) can sometimes be used to redirect the bees' flight pattern.

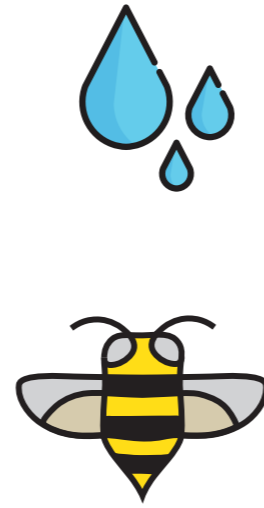
Hive Densities in an Urban Setting Beekeepers are advised to closely observe their apiary locations to determine the carrying capacity of the area

Many beekeepers in urban areas use rooftops for their hives. These sites are ideal as they are the least likely to affect neighbors and the hives, if well placed, can be kept out of sight – out of sight, out of mind.

Enclosed gardens In urban areas, bee gardens need to be as enclosed as possible, with high walls in front of and behind the hive to encourage the bees to fly high enough so as not to annoy neighbours. Then, if you are using gentle bees, you should get away with being an urban beekeeper.

The importance of water sources

Provision of Water Beekeepers must provide a constant and adequate water source. Bees use large amounts of water to control temperature and humidity within the hive. They prefer a sunny place with surface moisture—such as gravel, a sponge set in a dog water bowl or the edge of a birdbath—where they will not drown. The water should be kept fresh and clean so as not to become a breeding ground for mosquitoes. Beekeepers should establish such water sources near the apiary to encourage bees to forage for moisture near the hive. In hot weather, honeybees use large amounts of water to control temperature and humidity within the hive. It is particularly important in an urban environment to provide a source of fresh and constant water for the honeybees, to prevent them from seeking water from sources such as air conditioners or other such locations where the honeybee would be perceived as a nuisance.



Avoiding complaints

TO MINIMIZE COMPLAINTS FROM NEIGHBOURS, OBSERVE THE FOLLOWING RULES:

- Don't keep too many hives on the property. Keep two or three at the most.
- Provide a water source.
- Keep gentle bees.
- Maximize your swarm-prevention techniques
- Collect any swarms quickly if they do occur.
- Stop bees from robbing
- Put the hives in a sunny, sheltered position, out of sight of neighbours.
- Erect a high fence around them to make them fly high after leaving the hive.
- Talk about your bees and their amazing pollination abilities with fruit and crops.
- Give your honey to your neighbours.

Keeping bees in an urban area takes common sense, explanation/education, gentle involvement, if possible, and a huge charm offensive involving honey. You will be surprised to find just how many people take a real interest in bees – if you take the trouble to tell them about bees and as long as they feel safe from them. The need to prevent drifting is the same in urban areas but, with fewer hives and a lack of space for long rows of hives, drifting will probably be very much reduced. Make sure your entrances face different ways, however.



Credit: Photo by Amelia Bartlett on Unsplash

Hive Management

Beekeepers should take into account that weather conditions influence bee behavior and plan to work with bees when conditions are favorable. Beekeepers should try to make sure that neighbors are not outdoors working or relaxing nearby when they open hives and should perform hive manipulations as quickly as possible with minimal disturbance to the bees.

Extended hive manipulations, particularly when removing honey, should be carefully planned to accommodate neighbors' activities. Smoke should be used when working bees. Hive entrances should be smoked before mowing or trimming in the hive area. Clippings and exhaust should be directed away from hive entrances. Consider using a manipulation cloth (to cover the top of the open hive) in extreme heat or to otherwise minimize hive disruption.

So, it is springtime, and you have left your newly arrived bees for a week to settle in to their new surroundings. You now want your colonies to expand and, hopefully to produce a surplus of honey that you can extract.

First, you should look into the hives to see what is going on. What you are looking for is as follows:

- Is there a queen and is she laying eggs?
- Is there brood of all ages present?
- Are there any signs of diseases/pests? This includes a look at the general cleanliness in the hive, especially the floor.
- Has the colony sufficient food stores (honey and pollen)?
- Has the colony built up in numbers and number of frames covered since you installed them (or since your last visit)?
- If so, have they enough room?



Prime-swarms

METHODS TO PREVENT SWARMING

Good swarm-prevention methods should reduce swarming with a low degree of colony interference and should be compatible with good colony management for both pleasure and profit. It goes without saying that a very good method is to obtain a strain of bees that has a lower tendency to swarm. This is, of course, not always possible but, if you are in a position to use this method and still keep your beekeeping pleasurable and profitable, don't dismiss it. When considering your swarm-control strategy, try to think in terms of employing the following manipulations in conjunction with each other, not as isolated examples.

RE-QUEENING ANNUALLY (OR AT LEAST EVERY TWO YEARS)

This is one of the best methods for limiting swarming in your colonies, especially for a beekeeper with only a few colonies it is an easy method to employ. Fall or autumn re-queening is perhaps more difficult than spring re-queening, but it has so many advantages over spring re-queening.



REVERSING HIVE BODIES

In the early spring, reversing hive bodies can be a useful and effective method of swarm prevention. This simply involves swapping the positions of the upper and lower brood boxes (if you have them). Alternatively you can place a second brood box on top of Start this when you see a number of queen cups or before, if possible. Don't leave it to the stage when queen cells are started. This manipulation is very simple – whole boxes are moved, and this is effective especially if used in conjunction with other methods. After about two weeks, reverse them again if the bees have moved up and keep this up until the end of the swarming season.

SUPERING UP

This involves putting honey supers on to the brood body(s) in time for the honey flow. The first box should be filled with comb, especially if the season is early – bees have difficulty producing wax early on in the year.

KEEPING YOUR COLONIES EQUAL IN STRENGTH

This can be done in two ways. You can move frames of brood from strong colonies in danger of overcrowding to weaker colonies, or you can swap the positions of weak and strong hives. This latter manipulation can also be quite effective on hives that are near to swarming. In both cases you should ensure that both colonies are free from disease.

VENTILATING YOUR HIVES

Good hive ventilation goes a long way to lessen the swarming impulse if other methods are employed as well.

CONTROLLING SWARMING

But what if you have missed all the signs and you look in your crowded hive one day during the swarming season and find queen cells? You've left it a little late but you can at least step in here to ensure the inevitable swarm will stay in your apiary in one of your hives and not fly off to some neighbour! Check to see if your colony has already swarmed (a good reason for having marked queens). If it hasn't or if it has and is still very populous, you can carry out the following manipulations.

THE ARTIFICIAL SWARM

This involves splitting a hive into two colonies.

It is easily done:

- Place a brood box on a floor on top of the existing hive, with the entrance facing the opposite way to the hive, or place it nearby in the apiary.
- Take two frames of brood (capped and uncapped) with as many adhering bees as possible and place them in this box.
- Place a frame of honey and pollen either side of them.
- Fill the rest of the box with foundation or comb.
- In between the two brood frames, place a caged queen or a queen cell.
- If necessary, shake in some more bees from a brood frame to make up the numbers. „
- Give the new colony some sugar syrup in the frame feeder and place it near to the other occupied frames and close the hive.
- Reduce the entrance to one bee space to discourage robbing, or block a reduced entrance with grass so that robbing won't occur and the bees in the new hive won't rush out and return to the old hive.
- Fill the old hive with comb and close up.

The demaree method

This method keeps the hive together so that it can take advantage of a honey flow, but it is time consuming and difficult to do on a large scale. It is, however, an excellent swarm-prevention method for the hobbyist. If you find queen cells in the colony, follow this procedure:

- **DESTROY ALL QUEEN CELLS. DON'T MISS ANY.**
- **PLACE ALL THE FRAMES OF BROOD INTO A NEW BROOD CHAMBER.**
- **PLACE EMPTY FRAMES OF COMB IN THE ORIGINAL BROOD CHAMBER.**
- **FIND THE QUEEN AND PUT HER INTO THIS EMPTY BROOD CHAMBER.**
She will probably be with the brood in the new brood chamber
- **ON THIS NEW BROOD CHAMBER, PLACE A QUEEN EXCLUDER OR A SUPER OF HONEY**
(which acts as a queen excluder).
- **PLACE THE NEW BROOD CHAMBER(S) ABOVE THIS.**
- **AFTER SEVEN TO EIGHT DAYS, DESTROY ALL QUEEN CELLS IN THE UPPER BROOD CHAMBER(S).**

You can see what is happening here. You are giving the queen a new nest in which there is plenty of room to lay eggs. You are effectively stopping the bees in the upper brood chambers from swarming because they have no queen up there, but you are also allowing for the colony's normalization because you are keeping it all together while preventing the upper part from raising new queens by destroying any queen cells. Overall, the colony retains its bees and so is able to take advantage of any honey flow.

Method of artificial swarm

The procedure for this is as follows:

- **MOVE THE ENTIRE HIVE TO A NEW POSITION.**
- **PLACE A NEW BROOD BOX WITH FLOOR IN THE OLD POSITION.**
- **PUT THE QUEEN ON A FRAME OF BROOD IN THE NEW BOX.**
- **FILL THE NEW BOX WITH FRAMES OF FOUNDATION OR COMB.**
- **PLACE THE ORIGINAL SUPERS WITH OR WITHOUT THE QUEEN EXCLUDER IN THE NEW HIVE.**
- **POSITION THE OLD HIVE ANYWHERE IN THE APIARY.**
- **CUT OUT ALL THE QUEEN CELLS IN THE OLD HIVE.**
- **ONE WEEK LATER, AGAIN CUT OUT ALL THE NEW QUEEN CELLS IN THE OLD HIVE EXCEPT ONE.**

This procedure is effective and easier than it looks but, like all artificial swarming, it splits the colony into two. If you want it to take full advantage of a nectar flow, therefore, you should unite the two halves before the flow starts. The disadvantages of this procedure are evident: you must find the queen, which can be difficult, and if you want to destroy all the queen cells, you mustn't miss any.

Unable to find the queen?

If you cannot find the queen and you want to complete an artificial swarm, carry out the following procedure:

1. Cut out all the queen cells – all of them. „
2. Split the colony into two, ensuring that each half has eggs and young brood.
3. Place one half elsewhere in the apiary.
4. Block the entrances of the moved box with grass. The bees will eventually remove it and, by the time they have done this, they will have become accustomed to their new hive and won't fly back to the original one. „After three days look at each half. The half with eggs will have the queen and the other half will probably have queen cells.
5. In the queenless colony, cut out the queen cells, except one. The bees will raise a queen from this. Or introduce a queen you have purchased in a queen cage.



The queen removal method

This is another effective but time-consuming method of swarm control where the queen cells are found in a colony. Maybe that it was a fail-safe method of stopping swarming in a colony. It is simple and reliable, no extra equipment or boxes are needed, and can be used in conjunction with your annual queen replacement. However, the time between finding and removing the queen and a new queen laying can be as much as three weeks. During this time, the colony may do little work, even during a honey flow.

CARRY OUT THE FOLLOWING PROCEDURE:

Find and remove the queen. If you are going to re-queen your hive with a new queen or a queen cell, the old queen must be killed. If you intend to keep her on, place her on a frame of brood and bees into a nucleus box, add some frames of comb and set aside.

Destroy all queen cells except one. Or destroy the queen cells and replace with one of your own. Or destroy all queen cells; repeat a week later and, a week after this, introduce a new queen in a cage or reintroduce the original queen. Seven days after each step, inspect the colony and remove any new queen cells. If, after removing the queen at the first step above you see a virgin queen on the comb – and this does happen – she can be left on the comb. The colony with the new virgin will probably not swarm.



Handling unexpected situations

Things occasionally don't go to plan. The swarm may hang up in impossible situations, you don't have a swarm box handy to put them in, or you have five spare frames only and just two of these have wax and you have no feed. Well all that's OK: bees are hardy creatures. They weren't expecting foundation frames and a feed of sugar syrup anyway. Just do what you can for the moment. Give them the two frames and fill the rest in a couple of days.

Bees can survive without feed for a while, and I've often not given them any at all if good nectar sources were available – which, of course, you have made sure about anyway.

If you can meet the ideal, then do, because it hurries up the process of the swarm becoming a productive hive. If you can't, don't worry: do what you can and give yourself time to sort it all out later.

Putting the swarm back into the original hive

One final way of dealing with a swarm is to tip it back into the hive from which it came – if you know it and if it's one of yours. If you definitely don't want increase you can do this. The two queens will fight it out and one will live to head the colony.

Try to prevent the swarming process from starting in the first place but, if it occurs and I see it, I take the opportunity of increasing stocks and giving the swarm some work to do in making comb.

Harvesting honey

Honey can be harvested as the season progresses or at the end of the season. This decision is usually based on the existence of the honey flows in the area.

Knowing when to harvest Honey can be extracted when it has been capped over by the bees on the comb. At this stage, the honey will have been 'matured' by the bees, sealed up and is ready to eat.

always use a rule of thumb here: if three quarters of the honey is sealed,

The lack of knowledge or negligence of good hygiene practices on the extraction phase of honey leads to its contamination and consequently to the occurrence of quality changes (fermentations) or to food-borne toxins (infantile butolism) that often cause High social and economic costs (Snowdon and Cliver 1996, ICMSF 1998, European Commission, 2002).



Don't mix it up: these are no bees, but wasps.
Photo by Enrique Vidal Flores on Unsplash

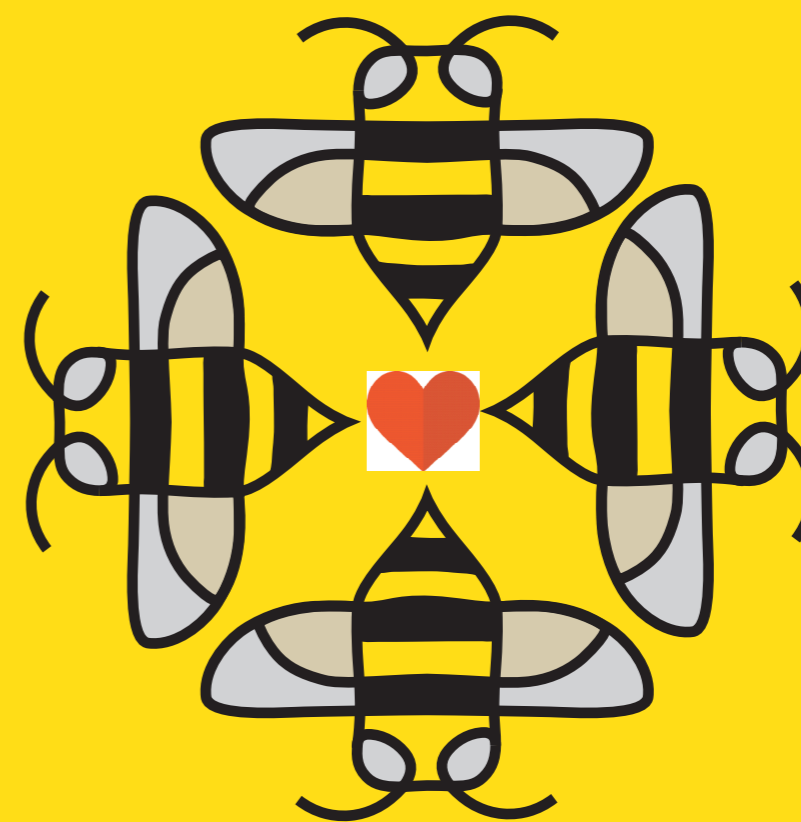


Critical opinions on urban beekeeping

Critical opinions regarding beekeeping in urban areas, particularly in the Iberian peninsula and which mainly reflect 3 types of concern

- **THE ENVIRONMENT.** the mystic rituals, before and after opening the hive, during, hyperstimulation of the senses that leads us to detect in an intense way the movements colors and odors of a hive, which in urban areas is limited by the fact that the time factor is essential for the safety of others (neighbors)
- **THE QUALITY OF HONEY.** Honey is undoubtedly „the product“, in this context the quality of honey in urban areas reflects the indece of pollution of the area where it is inserted, namely in heavy particles deposited in the polem and propolis collected by the bees. Consumption of this product may not be „as sweet“ as expected
- **THE FACT THAT BEES CAN BE ANNOYING, EVEN HARMFUL AND DANGEROUS,** for other people. There are those who have psychological problems with them and are frightened by the presence of a bee in its vicinity. There are those who have health problems related to them, as is the case of many allergic to their sting, and there are those who do not face either of these two problems but who do not have to suffering while we enjoy our hobby.
This point applies essentially to the Iberian peninsula in which the **dominant subspecies (Apis mellifera iberiensis)** has a more defensive behavior. These other bees are more docile and manageable, such as **meat, lingustica (Italian) or Buckfast**, are those that appear in videos made in European cities and flooding the Internet and the websites of urban beekeeping, where unprotected beekeepers, handle honeycombs and bees as if they were flies. Take these other bees to our country (Portugal or Spain) to use them in the cities - as seems to be happening can be even more counterproductive than using our own. It is a fact that native bees will form hybrids and it is a fact that the hybrids are most often more aggressive than the **native bees (Iberian).**

Best practice in beekeeping





Spain

Beekeeping best practices developed in Can Masdeu from March 2015 till September 2017



Our bees are located on the rooftop of the building where we live (21 grown ups and 6 children), on a 200 m2 roof terrace. They are next to a room and close to the Social Center Garden where every Sunday from September to June a group between 50 and 200 people participate and enjoy from workshops, presentations and concerts.

Even though we are not strictly in the city, our beehives are above living spaces and surrounded by human activity.

Therefore, the two main priorities for us have always been keeping the bees alive and healthy and a gentle management in order to avoid making them angry and enable a successful experience of coexistence, and understanding and managing the risk related to beekeeping.

Use of internet to access a wider beekeepers community

With lack of information and practical experience on urban beekeeping, no functioning beekeepers association in Barcelona, and little availability from ecological beekeepers to offer practical assistance. Internet resources have been essential in our beekeeping learning process. Tutorials and articles, videos and images to make sure about our diagnosis and identifications. Also the spanish beekeeping forum “Salines” has been really helpful, when consulting older posts or getting questions answered in hours to days. Specifically, we bought our nucs from a queen rearer recommended by the community in that forum. We have also bought most of our beekeeping material from Internet.

Passive swarm catching

We had an experience with an unexpected swarm which got installed in an insulating air chamber beneath the roof of the building. Ever since, we have always left an empty box with prepared (wax strip foundation) frames on the roof just in case, and swarms have kept appearing. In our view, it is much more sensible to leave empty nuc boxes in locations where swarms are prone to appear than to have to remove them from difficult locations.



Autoctonous bees

Our bees belong to the **autoctonous breed Apis Mellifera Iberiensis**. Many supposed experts are sceptic about the possibilities of urban beekeeping in Spain because Apis Mellifera Iberiensis is supposed to be more defensive than other breeds. In fact we think this is the kind of statement that is taken as a fact coming from figures of authority, and keeps being repeated and defining a consensual truth, but never put to test. From our relatively short experience we have found that, as we will explain later, **with gentle management** is possible to have bees really close to living and public spaces.

What probably our bees will not tolerate is working with little smoke, or without a protection suit. As we have notice and will explain later, the use of smoke is specially important as bees have a well developed instinct to fill themselves with honey, not to be able to escape a forest fire, but to be able to escape the burnt (foodless) area later on. But in any case, it remains as a point of debate whether it would be worth to work with different strains of bees noted for their docility, making beekeeping more accesible to beginners and easier to implement in cities. We consider that we are really lucky to have an autoctonous, well adapted strain of bees and having to be more careful and having to use more protection is a reasonable price to pay. Furthermore, it seems that it is difficult to maintain this colonies of imported queens except through frequent queen replacement, and there is a danger of hybridization which can lead to very aggressive colonies.



Gardening for bees

We have been incorporating more meliphorous species in our vegetable garden and surroundings, with the objective of having nectar and pollen available for bees all year round.



Keeping the bees healthy

The first challenge that a beginner beekeeper faces is which system to use.

TWO HOT DEBATES ARE:

- Size and shape of beehive (is there a “perfect beehive”). Beehive designs.
- Treatment free ideal.

After considering many alternative beehive designs, we have found a compromise between the bees needs and our own. Basically we use the standard material (Langstroth) with some important management modifications to develop a more natural way of beekeeping.

Actually, after our experience we would not recommend a topbar or Warre hive to beginners, specially to beginners in urban or periurban areas: it is much easier to break comb and irritate the bees during inspections or harvesting.

In Spain, Layens beehives are often available for free as it used to be the most common beehive system. They are built for transhumance and we think they are not suitable for urban beekeeping: the frames are big so difficult to lift and inspect, they are built in one piece so they have to be modified in other to have a sanitary bottom, and there are supers but not easily available.

THESE IMPORTANT MODIFICATIONS ARE:

ENLARGED BROOD NEST

We use 2 Langstroth boxes as a brood nest: it is bigger than a Dadant brood nest.

REGULAR INSPECTIONS

We inspect the bees at least once a month, and once every 2 weeks from March to June.

Most of the inspection are superficial, but at least we make sure that there is no cross comb which could be a real problem in case of a deeper inspection or harvest.

MINIMAL STAMPED WAX USE

We use standard Langstroth frames as they are easier to lift and inspect.

But we have removed all except two lines of wiring 2 cm apart, to attach a thin (4 cm) strip of stamped wax as an starter strip to make sure bees will build straight comb.

Again it is a compromise between the bees needs (to build and live in their own wax) and our own as beekeepers: to have them build straight combs inside the frames, so it is possible to open the hive, inspect frames or harvest with minimal disturbance.

We have not considered using plastic foundation.

We think it is very important that bees are allowed to breed and live in their own wax. It is very difficult to find ecological wax (always out of stock in the online shops we have ordered from) and when it is available often it is imported from very far away and can pose ethical concerns regarding the way of extraction.

Another hot debate is about the size of cells in **stamped wax**. By using only a starter strip, our bees are able to build their cells in the size they prefer.

We harvest our honey through the “crush and strain” method, therefore, we harvest wax together with honey, which is 80% from our bees. Our plans for next spring include melting and shaping starter strips.

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AVOID SUGAR FEEDING

We have taken as a principle to avoid feeding sugar to the bees as a regular practice (so, only to save them from starving, and if there is no honey frame available).

We made an exception this spring with the 5 purchased nucs and fed them some sugar syrup.

SANITARY BOTTOM FOR VARROA MONITORING

The main threat to our beehives health is Varroa Destructor.

We have found that sanitary bottoms are essential for monitoring actual levels of infestation and treatment results. We would definitely recommend them to every beginner beekeeper, together with a plant for monitoring and recording mite levels. Also, they provide some passive mite elimination. Mite counting can become cumbersome, it would be great to have an app to do the task. It seems that there is at least one such app in development (varroacounter.com).

TREATING AGAINST VARROA: OXALIC ACID SUBLIMATION

While we believe that the ultimate solution to varroa is genetic selection, as beginners with a small apiary we can not risk to lose our hives to varroa.

There is practically no broodless period in our climate (and it can happen more easily during the hottest and driest period of the summer than during winter!) so most ecological treatment are not prove effective.

We need a treatment that can allow us to knock down varroa numbers whenever necessary, in presence of brood or honey supers.

We feel really fortunate to have found oxalic acid, which we sublimate with a vaporiser.

Together with the sanitary bottom, we use oxalic acid to monitor real mite numbers and do repeated treatments during a brood cycle.

GENTLE BEEKEEPING

Opening beehives only in best conditions:

Having the hives so close to our living and working space means we can afford to open the hives only when the weather conditions are the best (during midday in sunny, windless days, except during the hottest part of summer that is better to open the beehives during the morning) and when we are sure that nobody will be working or staying in the roof during the inspection and the rest of that day.

Slow careful movements when lifting frames.

We have observed from our own experience that the most important factor to avoid irritating the bees are:

- Having the beehive set properly (level base, material in good state, wax starter strips, etc)
- Correct use of smoke in quality and quantity.
- Correct hive opening and frame manipulation: being able to perform slow and fluid movements when lifting and moving frames is one of the most difficult but most important parts of beginning beekeeping.

PROVIDING WATER (THROUGH A WHITE TOWEL)

Bees started to go in great numbers to our swimming pool (actually an open water tank to store irrigation water) during a hot spell in June, we installed a water container protected by a white towel (drinks much prefer to suck moisture than to risk falling in the water, also the white towel protects the water from evaporating) and it took them a week approximately to stop going to the water container next to their hives.

Next spring we will have sure to provide with water before the weather gets hot.

WHITE SMOKE

We have observed big differences in bee's behaviour depending on the way of smoking them. Specifically, it is very important to have relatively cold smoke with a high content of water and white appearance.

We use brown paper (non printed, non bleached) from flour bags to start the fire and then ecological straw. Once the smoker is burning properly we spray the straw on the top with water from a small spray bottle. While we work with the beehives we refuel and spray with water as necessary to keep the smoke abundant, white and cold.

RISK MANAGEMENT

A great part of our efforts are directed towards helping the public understand the risks of bees and other stinging insects, to take them in their right proportion and be able to react efficiently and without panicking when someone gets stung.

Using full protection suit while working with the bees and druing workshops

We keep a special box in our first aid shelf in with tweezers to remove the sting, moxas to heat the stung part and antihistaminics and injectable adrenaline in case of strong allergic reactions. We think it would be very important for all beekeepers to keep such a first hand kit, and also for urban gardens and many other places, as most people get stung by wasps.

On the very first basic level we teach people to differentiate between bees and wasps, and further, between wild, solitary bees and domestic. Allergy to bees does not necessarily mean you are allergic to wasps, and viceversa (some people might be allergic to both).

EARLY REMOVAL OF STING

In case someone gets stung by a bees, the most important thing is to remove the sting without pressing the venom bag still attached.

MOXA METHOD

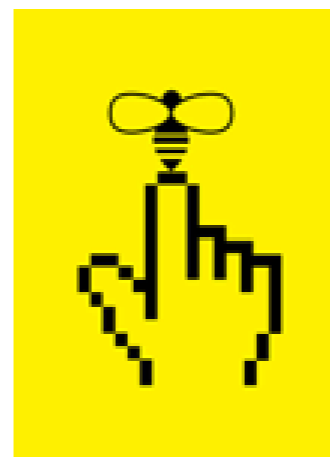
This method is not well known or applied but for us is the best way to treat bees venom.

We had it explained as being used by a Corsican beekeeper with a cigarette: the idea is to approach the cigarette burning tip as close enough to the stung area to heat it up without burning the skin, and move it in a circular motion. Part of the poison is supposed to be destroyed. Instead of



Hungary

Beekeeping best practices
in Budapest from February
2015 till February 2017



SOCIAL HONEY: New Museum for Bees & Mixed Bee Group / finger group

In 2013, Budapest's first urban bee yard was founded in collaboration with the German finger group, on the back terrace of the Kunsthalle, a leading art institution in Hungary, which has been the protagonist of cultural policy controversies in the past years. Titled Social Honey, the project was conceived at the intersection of social engagement, education and art, and took the two pillars of the Frankfurt-based artists' activities - the Mixed Bee Group and the New Museum of Bees - as its starting point.





Responding to the challenges of a radically polarised Hungarian society, where poverty, unemployment and homelessness have substantially increased recently due to the economic crisis, the Mixed Bee Group brought together an unusually diverse, temporary community of participants eager to learn the skills of beekeeping and collectively tend the bee yard. Launched via an open call for participation, the group resembled a micro-model of society, including forty people from different age groups, social backgrounds and living conditions. People - who otherwise have very little (if any) contact with one another in their everyday lives - met weekly to collaborate and exchange, in dialogue with the artists and various experts of the Hungarian beekeeping field. Coordinated by a local beekeeper, the group produced 65 kilos of "urban honey" from July till mid-August, which was tested in a local laboratory and sold on donation-basis to the visitors of the New Museum for Bees.

A conceptual museum open to both humans and bees, the New Museum for Bees regards artistic production as a space of resonance for socially formative processes. Its Budapest branch hosted three exhibitions, dealing with the Hungarian political situation, as well as overarching global problems, such as sustainability and food shortage. Do bees do a better democracy than we do? offered insight into the inner workings of honeybee democracy, advocating collective decision-making and swarm intelligence, summing up what we could learn from bees in "swarm smarts". Should we eat them? focused on the UN Food and Agriculture Organization's 2013 study, highlighting the role of edible insects (incl. bee puppets) as food for humans and feed for animal consumption and arguing for a paradigm shift in our traditional diets and food production. Visitors were invited to cast their vote in a transparent ballot box. The Mixed Bee Group was also introduced in the exhibition as an alternative working model, fostering solidarity and mutual understanding and empowering people in precarious living conditions with new skills and perspectives.

The museum itself proposed a new economic model for cultural institutions, as on the long term its operation and programme can be financed by the honey production of the hives that host the museum: an interesting scenario in the Hungarian context where the autonomy and independence of art institutions (e.g. Kunsthalle) is at stake.

(Text written by Katalin Erdődi and published in Lumen Station #3 – Reap and Sow, edited by Virág Major)



VOLUNTARY URBAN BEEKEEPER GROUP

After Social Honey program the participants decided to stay together as a group. Messzelato Association's two employees were also involved in the group actively and decided to write the KA2 Strategic partnership on European level and start a cooperation in 4 main cities of Europe.

Our local bee group consists of 8-10 active people from Budapest and have a supporting email group of 70 interested members for communicating meetings, events, interesting news.

Our aims is to learn about beekeeping as urban people and practice in our city, to organize programs for each other and for general public and search for suitable place for placing our 3 beehives.



Budapest is a city with 2 million citizen and 525 km². In the green outskirts it is widely popular the beekeeping as also in the neighbouring villages. In general Hungary in Europe is the most "bee populated" country according to the Hungarian National Bee Association. 17.000 beekeepers operating in Hungary average managing 100-200 hives. So it is considered a big business so existing bee associations are helping for the needs of big scale beekeepers. They are welcoming small scale "hobby" beekeeping and we just found open and interested beekeepers but there is not existing hobby beekeeper education. Only our major cities with high density of population are lacking beekeeping. Although there is existing big cities like Berlin, London, New York and Paris where beekeeping is accepted and working well with the acceptance of the public. We send several calls out for searching places and visited more than 20 suitable places. At the end we found a place for our beehives in 2015. It was located in the 10th districts of Budapest just on the border of Wekerle in a local garden.



Location search

We send several calls out for searching place to set our urban apiary up. We visited more than 20 suitable places. At the end we found a place for our behives in 2015. It was located in the 10th districts of Budapest just on the border of Wekerle in a local garden.

THE MAIN PLACES REACHED:

- 7 Community gardens of Budapest
- Budapest Zoo
- Botanical garden of Budapest
- Agricultural Museum
- Hilton Hotel and other hotels
- Greenpeace local office balcony
- Prezi
- Magnet Ethical Bank
- Church garden in 11th districts
- Cementary of 8th district
- Community center in 2nd district
- University of Horticulure
- University of Arts
- Waldorf school in 17th district
- High school of Polytechnic
- High School of Dobos C József

In general public is interested about the urban beekeeping, but the non-profit and community approach and the fear about bee stungs are a border for setting up the apiary.



URBAN COMMUNITY GARDEN (Grundkert) SWARM MANAGEMENT

Our group get to know that there are a wild bee family living in the community garden Grundk3rt (www.grundkert.blog.hu) in the 8th district. Grundkert is the second oldest community garden in Budapest which was established in 2012?. It has a strong and resilient local community who is involved in the garden with wonderful and colourful people. The garden moved already 2 times with soil, shelter hut already and some garden member also quoted: "we are like migrants move from one place to antoher, if this beefamily descided to live next to us, then we should not move them away."

The garden members reported in 2016 that the family is living in the neighbouring abadoned house next to them they asked our beekeeper group to examine them and give them advice how to live in a calm way next to them. For our advice for risk management we gave them a lecture what they can do and what they cannot do next to a bee family. They get a first aid kit to bee stungs and also advice on beeallergic reaction.

Urban bee family saving 2016.07.21.

The family was up to swarm in the summer so we went and check them. The group and the garden decided that we trap them in a hive that we can actually can examine them if they what condition they are living also not to let them to fly away into another place.

We did this: <https://honey-sun.com/tech-tools/hogans-bee-trap/>



Local beekeeper voluntary help

Our bee group has 3 practicing beekeepers and 20 people are just interested who want to learn about beekeeping. Our active group was btw 6-10 people for the years. We volunteered and visited beekeepers and got 3 beehives and 4 families for free from one supportive beekeeper who we visited.

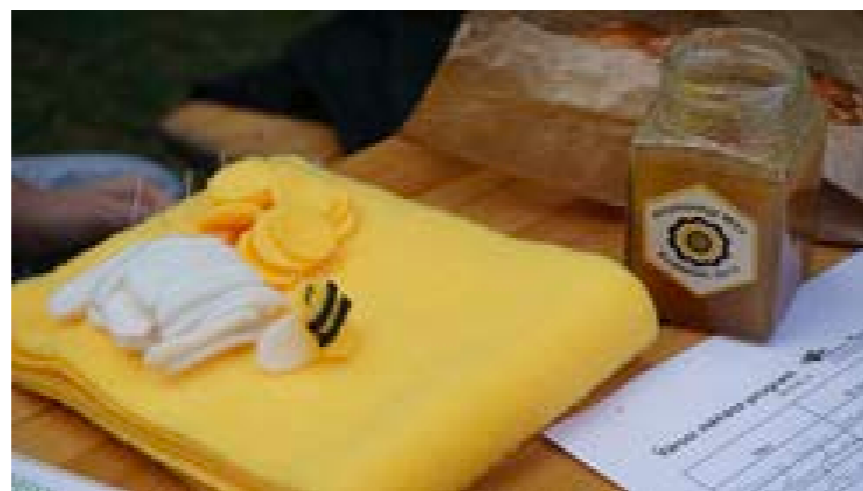
We organized events (natural cream making, infuse with herbs honey, learn about natural beekeeping) and also weekly visited the beehives in the season to learn by practicing beekeeping.



We put this on their door which they can go out and they cannot return. We used these equipments (old beehive, new beequeen, some workers with her, metal tube, gips for putting the tube on the wall). Csaba our experienced beekeeper is applying the new door and the new hive which has a new beequeen and some bees and honey.

Tadaaaam. We check if they accept their new home and then we start to examine and treat them. Welcome newbees! Unfortunately the bee family didn't like our behive and stayed in the hole of the wall, but it was a nice experiment to save bees in urban environment.

DISSEMINATION – introducing our project & products at Wekerle Festival, Budapest



HIGH SCHOOL EVENTS

1. Beehotel and garden furniture making with high school students

Wild (solitary) bees should be free to widen their territory and be able to find food and nesting zones anywhere, including urban and peri-urban spaces. Solitary bees are, unlike bumblebees and honey bees, harmless and non-aggressive.

Since people are destroying their natural habitat on a daily basis, it has been proven useful to build „bee hotels“. Bee hotels are nothing more than groups of tubes and can be easily made in your own garden as also in a school garden.

1. You only need a wooden box, open on one side, with a sloping roof to deflect rain (or just a simple square frame, made of four planks). Dimensions are up to you. For a box you can use any timber you can find.
2. Find small logs (in which you previously have to drill the holes depending on the length of your drill bits) or simply use garden canes or dried out flower stalks, pinecones.
3. Put these logs or garden cans into the box/frame.
4. Set your hotel on a sunny spot.





2. Lotion bar making with high school students

The first day was spent with making cosmetics out of beeswax, spices and oil. Of course, to the students it was a bizarre concept but after trying it out for themselves, they were convinced how easy, convenient and amazing it is. Our teachers, Tünde and Kata, are really good at giving information about bees in general and the making progress while keeping the kids entertained. The whole process is quite simple - melt the beeswax and mix it with olive and sesame oil with ration 1 to 1 to 1. It gives quite nice, solid enough hard lotion with smooth texture.

We made this with high school students who were specialized on cooking. There was a big interest on it so at the end we made two sessions with 22 students in two periods. They enjoyed it and like to play with ingredients and next to it we could introduce bees life in another way for them.

RECIPE:

1 part sunflowerseed oil
1 part beeswax
essential oils, honey, propolis,
cinnamon, cacao, coffee if you want

PREPARATION:

You place your oil and beeswax in a bowl up on a bowl of boiling water. Experiment with the proportion how hard you want your lotion bar. When they are dissolved with each other add honey, propolis and cinnamon if you want. Pour them in some small containers and let it cool before you get them out.



Berlin

Urban Beekeeping best practices
by Kulturlabor Trial&Error e.V. from
March 2015 till September 2017

BUILDING A COMMUNITY AROUND URBAN BEEKEEPING

Grown from an informal upcyclers initiative, Kulturlabor has become a neighbourhood centre, international project coordinator, tackling such topics as solidarity economies, sharing and open knowledge, environmental awareness, collective organization forms, youth empowerment, non formal education and others. Bottom-up approach, horizontal organisation as well as community are amongst the core values of the Berlin based collective, diverse by nationalities, skills, backgrounds and views.

So what does that all has to do with beekeeping? Inspired from various concepts as transition towns, sociocracy, Kulturlabor strives to engage the local community in the neighbourhood activities, prototyping patterns and testing ideas for post capitalistic urban future. Having rather holistic approach, the collective opens discussions and questions our ideas of food, transportation, education, work, wellbeing, gets hands on experience, experiments and looks at ways and concepts that can improve the quality of life in a sustainable way within our community.

And urban beekeeping is one of those ways.

Understanding the issue

(about bee keeping in Berlin / legally, situation)

We found out that urban beekeeping for young Berliners and newcomers is becoming almost as the new craft-beer making. Curious wannabe beekeepers are experimenting with bees and practicing beekeeping in likely and also very unlikely places.

Researching the environment

Berlin is known for its parks, community spaces, allotments and gardens. Botanical, intercultural, community, or guerilla, the urban gardens are un-separated part of the city identity. As our research started from neighbourhood shop with an urban gardening project, logically our path to discover, what's up in the urban beekeeping scene, first lead through all the urban gardening projects in the neighbourhood.

**PRACHTTOMATE
ALLMENDE KONTOR
HIVE ON A GRAVEYARD
HIVE ON A BALCONY NEXT TO A NIGHT CLUB
HIVE IN A SCHOOL YARD**

Building a community

As an approach we called for what we call - a knowledge sharing rounds.

REACHING OUT TO THE TARGET GROUP

In the end, the project focus is to educate young people about democracy through beekeeping. And we decided to turn it around - using our approach of empowering participants to learn, connect, self organise and maintain autonomous communities, we aim to urge the curiosity and invite participants to discover the secret world of bees.

As discovered in the research face, the average knowledge of our target group about bees is rather beginners level, we worked our couple of low-key methods - here are some of them.

**BEE HIVE DEMONSTRATION
HONEY TASTING
UPCYCLED BEES
PORTABLE INSECT HOSTELS
BOARD OF DISCUSSION
REFLECTIVE VIDEO WATCHING
FIELD VISITS
LITERATURE SHARING POLL
BUILDING OF A WARREN HIVE**