

Hive Inspections – the key to health and well-being in the hive

I like to think of myself as a Bee Detective. Every time I approach my hives I am in high alert observation mode. I can learn a lot about my hives just by observing them from the outside before I open them up. I have developed a method of hive inspection that has evolved over the years. I made a lot of mistakes in my early years of beekeeping, some of them quite frankly were fatal to the hives. Usually it involved too frequent, too careless and too disruptive manipulation of the hives. Many times this resulted in the loss of the queen. Sometimes that was apparent immediately, sometimes a few days later, sometimes I didn't realize it until the next season when the hive was dead in the spring. I eventually realized that one of the biggest stressors a beehive has is the beekeeper! I have resolved to never stop learning and tweaking my methods. I have also realized I can pick up useful information from anywhere, even if the source of the information is actually trying to teach the opposite of what I learned. I never discount the advice of long-time beekeepers. I re-learned how to use a hive tool when I had been keeping bees for eight or nine years because an experienced beekeeper pointed out how my method was destroying my hive bodies and also putting queens at risk. So, the bottom line is this: You are never an expert beekeeper, no matter how many years you have kept bees. Bees have a way of making you humble. I have kept other livestock for years and honestly can say I feel pretty confident in my management and its success. You never get there with bees. They are wild creatures who consent to live in your man-made hives. They never really belong to you. They don't read the beekeeping books. It is in the beekeeper's best interest to study them and see what they seem to like best, or what really doesn't matter to them, and proceed from there.

That said, let's go over the basics:

When should I inspect the hives?

1. First of all, consult the weather forecast. You can't just open the hives because you have Saturday afternoon off, and that works best for your schedule. The best time to open the hives is on a sunny, calm afternoon when there is no stormy weather in the forecast. If it is really hot, you can open the hives in the mid-morning during the summer. You should never dig down into the hives if the temperature is below 60 degrees Fahrenheit. It is really ideal to wait until the temps are in the 70's before doing anything more than removing the top cover and inner cover. In late winter or early spring you can determine if the bees need to be fed by taking off the top cover and inner cover and observing if there are bees right up at the top. If the cluster is up top and it is too early for the bees to find forage, it is advisable to artificially feed the bees until natural forage is available. This needs to be done with a method that does not require any more opening of the hive than just the top cover and inner cover.
2. First inspection of an overwintered hive should not take place until the daffodils are in FULL BLOOM in your area in the most open, cold places. You can tell a lot from the outside of a hive long before that, and you can tell if you have a laying queen in place just by outside observation. You should see pollen going into the hive as soon as the first willows and maples begin blooming in March here in Michigan. If you see the pollen going in, do not disturb the hive until the weather is warm enough to do so safely. I killed three hives one year opening them too early. I learned from that and I hope you will, too.
3. After the first hive opening, it is only necessary to open the hives once a month. In the early spring, if you wish to make splits, you can open the hive and pull frames for splits, but try to do this all at once and try to not open the hive within two weeks of the last opening, especially during this critical build-up period in the hive. Queens are touchy, and will get disturbed by too much manipulation and may shut down laying, or in a new package may abscond. Package bees will often supersede a queen, even if she is a good queen if you disrupt the hive too much.

4. If you make a new split and are letting them make their own queen, wait a whole month before disturbing that hive. If you are introducing a queen, check after three days to see if she has been released from her cage and release her if she is not being “balled” by the bees in the hive. After that, leave things undisturbed for a month to get everything going. Watch from the outside to make sure pollen is going in.

How do I open the hive?

1. First observe from the outside the “mood” of the beehive. Take note of the activity level of the bees. Have a smoker lit and in reach, but don’t use it unless necessary. Stand to the side or back of the beehive, never in front of the entrance. That just makes the bees mad. It is your goal to cause as little disruption as possible to the bees when inspecting.
2. Remove the top cover and set it upside down next to the hive. Next remove the inner cover and set it carefully nearby. At this point, observe the bees through the top bars, figuring out where the brood nest is and also assessing hive behavior.
3. If the bees are “queen-right” they will be busy about their business in an organized fashion. If it is early season and you don’t have a honey super on yet, they should be clustered and busy around the brood nest area. You can identify where that is by seeing where most of the bees and most of the activity is taking place.
4. Carefully use your hive tool to remove the outside frame. Move slowly and gently. Some people prefer to do this without gloves. I use gloves because if I got stung on my hand, I would not be slow or gentle. That said, use good fitting gloves that give you a measure of dexterity. Often this frame will be empty or just filled with honey. You can carefully set it on the ground outside the hive, or use a frame rest rack available from bee suppliers to put it on.
5. Now you have some room to move and can do an inspection without much disruption to the hive. With the extra space provided by taking out the outside frame, you can slide frames to the side and inspect them without removing them from the box.
6. If a frame is empty, you can remove it if you need more space. Be even more careful as you get to the edges of what appears to be the brood nest. It is very easy to accidentally crush a queen between frames. She will be laying eggs in empty cells either at the edges of brood frames or in empty frames on either side of the brood nest. The queen can be absolutely anywhere in the hive, so never assume you can just barge in like a bull in a china shop.
7. If you can inspect the brood frames without actually lifting them out of the hive box, that is best, especially if it is early in the season and the queen may be on them. You are looking for a good brood pattern, which means lots of worker brood, with very few empty cells. The oldest brood will be in the center of the frame. The youngest will be at the edges. Look for young larvae and eggs at the edges or in what appear to be empty cells in the middle where new eggs have been laid after older larvae emerged. Eggs are very tiny – about 2mm in length. To see eggs it is necessary to remove the frame from the hive and tip it so light shines in the cells. If you are using natural comb in foundationless frames, or top bars, do this very carefully, especially if it is new comb, because it can rip out and fall on the ground. Young eyes are helpful (take a kid with you), or you can use a magnifying glass to help see the eggs.
8. Natural comb will have a different configuration of brood than frames drawn from foundation. Worker brood and drone brood will be in the same frames, but you still want to see a good, tight brood pattern and more worker brood than drone brood.
9. The presence of eggs or very tiny larvae usually indicates you have a laying queen in the hive right now. It takes 10 days for brood to be capped, so if you only have capped brood and no young “open brood”, you may not have a live queen.
10. You only need to satisfy yourself that you have a queen presently in the hive. You do not need to actually see her.

11. A good queen will be prolific, meaning she will be filling brood frames rapidly and at least 2/3 of the brood will be worker brood, even in natural comb. She will have a tight brood pattern.
12. If you have removed any frames, make sure you replace them in the same order you took them out. NEVER break up the brood nest. Always add empty frames at the edges of the brood nest.
13. When you have finished inspecting the top box, carefully pop it off and set it on the upturned top cover at an angle, so it rests on the edges of the top cover, leaving a space under the box. This is to protect the queen if she should happen to fall from a frame if she is in that box. She will just fall into the upturned top cover and can quickly get back in the box. You don't want to lose her in the grass or crush her by placing the box flat down on the ground or inside the top cover.
14. Inspect the second box as you did the first. It is only necessary to go all the way down early in the spring. If the bottom box is completely empty, remove it. But be completely sure it is indeed empty before you do. It could have eggs in it. However, if it does, it should have nurse bees attending it.
15. Should you look for varroa, and if so, how? I personally feel if the hive is strong and healthy you won't have enough varroa to cause a problem anyway. I believe contrary to the mainstream that weak hives are caused by weak or dead queens and the varroa just come along and finish them off. However, the most effective and least invasive way to check for varroa in your hive is to open up some drone brood and look to see if there are any varroa feeding on the drone larvae. In a traditional Langstroth hive with worker cell sized foundation this is extremely easy to do because the bees will naturally build the drone comb on the bottom of the frames. This brood will be torn apart when you separate the boxes, exposing the drone brood for you. All you have to do is look. Varroa show up very easily on the white larvae as dark reddish brown spots. If you are using natural comb, just scrape open some of the drone brood (the drones have the raised, bullet shaped cappings) and look to see if there are any mites on the brood. This is actually a better indication than sugar rolls because sugar rolls just take off adhering mites that are on adult bees. If you have enough mites to have them on the adult bees, you are already in deep trouble. They incubate on the drone larva, so if you don't have any there, you don't have a varroa problem in your hives.
16. If you find varroa in your drone brood, figure out really quick why your hive is weak, because it certainly is. I have corrected weakness caused by queenlessness and chemical overspray and when the hive recovered the varroa disappeared.

What do I do after looking inside the hive?

1. If the brood pattern looks good, there are young larva or eggs, the population is strong and the bees are busy and not aggressive, carefully put the hive back together as it was. Make sure you record in some fashion the condition of the hive so you know what to look for when you inspect next month.
2. If there was no open brood, spotty drone brood or just a weak brood pattern and small population for the time of year or compared to other hives in the apiary, you may be queenless or have a weak or failing queen. You have several options at this point – A. Buy a purchased queen and introduce her; B. Take a frame or two or three of brood, at least one frame of which have eggs or very young larva, notch three cells with eggs and put that in the weak hive to encourage them to make a new queen; C. Move a queen cell from another hive or purchased from another beekeeper into the hive; or D. Let the hive die because you deem it not worth saving for some reason.

3. If you saw something in the hive that disturbed you, but you have no idea what to do about it, take a picture if you can, then close up the hive. Send the picture to your mentor or someone who may be able to help you and describe what the situation in the hive was. If you can't do any of that, still close up the hive, go back to the house, think about it, research it and do nothing at all until you have thoroughly thought out the situation. I killed several hives by hasty decisions. Nothing is going to kill the hive in 24 hours except an impulsive beekeeper who acts too quickly and actually does something fatal to the hive.
4. If you saw signs of disease or parasites, decide why your hive is weak. Most likely you are back to point #2. Which option you choose there depends on the time of year and the overall condition of the hive. Generally speaking, in our area it is not advisable to re-queen after the first day of summer, or July 4th at the very latest. If you are putting in a purchased queen, you can probably get by with mid to late July, but if you are having them make their own, no later than July 4th. If you wait until later, they simply will struggle to build up enough to successfully overwinter.
5. If it is past re-queening time and the hive is still making honey, and you are quite sure they are queenless, my personal choice is to let them make as much honey as they want, and then I take all of it for my use, because they will die over the winter anyway.
6. Queenless hives will also display decreased activity at the entrance, especially in the late summer. They may or may not be more aggressive, depending on the overall hive population. If the population is dwindling, they may not be aggressive. Hives that have swarmed will also have less activity. They need to be treated very carefully because somewhere in there is a virgin queen that may or may not have left for her mating flight. She also may or may not have successfully returned, so you don't want to disturb things too much if they are in process of re-queening.

Post-mortem hive inspection

1. You can learn a lot about why a hive died and if you could have done anything about it by doing a careful inspection of a dead hive.
2. Make absolutely sure the hive is dead before completely dismantling it, especially if it is winter or early spring and too cold for the bees to survive if you accidentally tore apart a live hive (it happens, does it sound like I know why?).
3. Open the hive as you would during a live hive inspection. The top boxes should be honey supers. Start there. Is there any honey in the hive? Is there a dead cluster of bees? If the dead cluster is in an empty or almost empty super with their heads all in cells, they most likely starved to death. If they are dead where there is plenty of honey, or pushed over to one side, they may have gotten too small to survive the cold, or could not move to more honey because of extreme cold. I once found the cluster with the dead, marked queen still in the center. She died, I believe of old age and they got too small and were no longer able to maintain enough heat to survive. I once found dead bees all over the hive, but not clustered. They apparently did not re-cluster after a balmy day followed by a cold night. Those bees were not adapted to our climate.
4. Is there no dead cluster? If this is the case, your bees died long before winter ever started. Most likely they were queenless and you didn't realize it. They dwindled and died. Often these hives will be robbed out of any honey by other hives. Put your detective hat on. If the hive is robbed out of honey, but there is little or no wax cappings on the bottom of the hive, it was robbed by other honeybees. If there is a pile of wax cappings and damaged comb, yellow jackets robbed the hive in the fall.

5. If there is a mouse nest (sometimes with the residents still in it) or wax moth activity, your hive has been empty for a while. In my experience, mice only move into empty or sparsely populated hives. Occasionally they will move into a bottom box if the hive has several boxes and the bees will be up top, separated by at least one empty box.
6. If you have a solid bottom board, you can dig through the debris to find more clues. Don't be surprised to find varroa mites, weak hives attract them because parasites are attracted to dying or stressed organisms. They are part of the decay process. However, don't be surprised if you don't find many, because varroa mites need bees to live, live bees that is, so after a hive gets too weak, they will die also. Varroa incubate on brood, so if a hive has been queenless (and broodless) for a while, there may be very little varroa activity.
7. Now that you are absolutely sure the hive is dead and you have tried to the best of your ability to figure out why it died, you can dismantle it. If there is honey left on the hive, save it out to put on new hives you start in the spring. If you don't need it for that, put it in a sheltered building until spring, then leave it out for the bees to rob. Only do this if you are absolutely sure the honey is not contaminated with foulbrood or some type of toxin that caused the demise of the hive it was on.
8. Clean, scrape and re-paint the remaining parts of the hive. Clean out frames. If they have plastic foundation, you can scrape them, or remove the foundation and replace it with clean foundation. Scrape the frames to clean them. Foundationless frames can be cleaned by removing the comb and scraping them clean, then they are good for re-use. Store the cleaned equipment in an enclosed building until you need it for a new hive, or swarm.