Stahlman beekeeping notes for 2021

Issue # 11 Is the new queen laying a good brood pattern?

If one starts with a new package of bees or a nuc, it is important to check on the progress of the queen. For the package introduction, the first thing to check after the bees have been installed is to answer the question – has the new queen been accepted by the bees?

Those who start with a nuc should not have to worry about that question!

Because the queen plays such an important role in the success of a colony of bees, it is important to inspect a new hive several times after the bees have been introduced. The biology of the life cycle of the honey bees is important for every beekeeper to understand and without new bees to replace the old bees in a hive, the hive is doomed.

It all starts with the queen! Her job is to lay eggs – lots of them. Bee books will vary in the number of eggs a queen can lay in a single day but there must also be a large population of nurse bees that can provide the 92 to 94 degrees F. required for the proper growing temperature of the brood. We can not expect a small population of bees to care for a large number of eggs a queen can lay in a single day.

Under normal circumstances a colony with a basketball sized cluster of worker bees can support a queen laying 1000 eggs a day. It takes 21 days for a worker bee to develop from an egg to a worker bee adult and chew its way out of a capped cell.

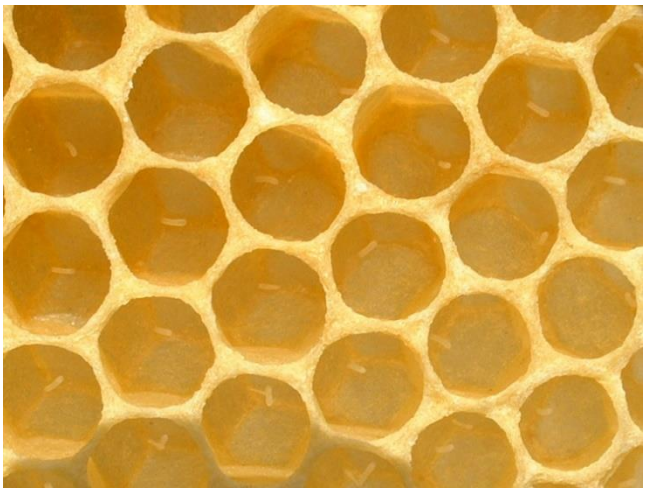
I have seen figures that a queen can lay 1500 to 2500 eggs in a single day. One thing we all know is the expansion of a colony of bees in the spring happens so fast that the bee keeper often finds the bees swarming before management of swarm control is taken by the beekeeper.

I would like to break this population growth down into something we can see.

Without eggs a hive will have no future generation of bees! Thus, the first step for every beekeeper is to determine if **the queen is laying eggs**.

Several things that make this easy:

- Queens that are marked are easy to see.
- Knowledge of what eggs look like is mandatory.
- Understanding the biological development of egg to adult is imperative.
- Being able to determine the area where the queen is laying eggs is important.

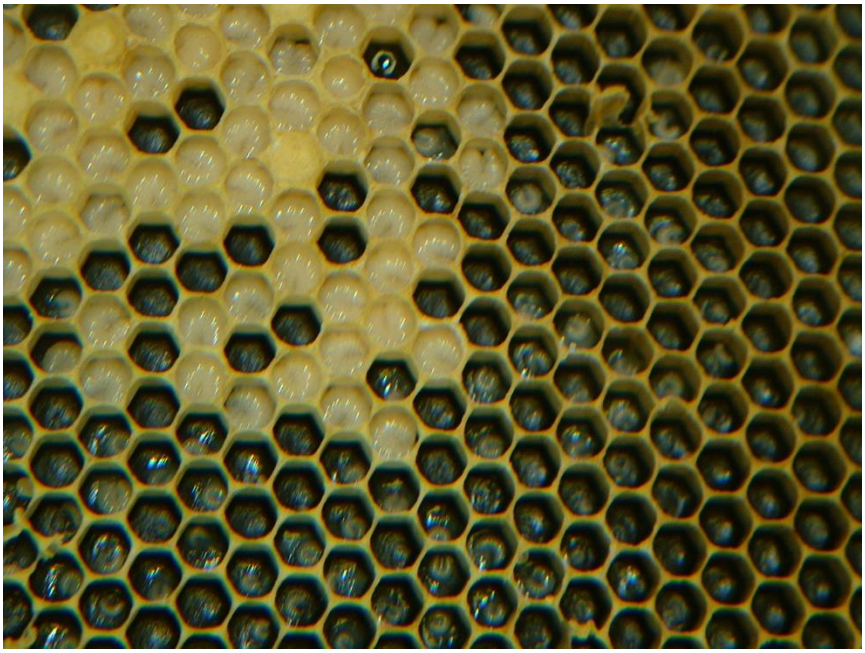


Eggs are somewhat hard to see especially if the foundation is natural beeswax.

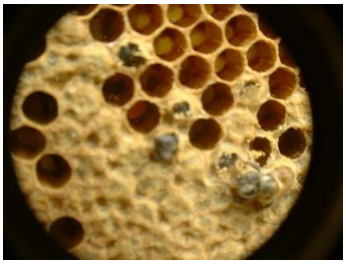
The queen is usually found in the area where brood is located. This is the brood nest.

Each egg will be fed by nurse bees when it hatches and become a small worm called a larva.

The larva shown below develop rapidly and are fed a high protein diet called bee bread. I heard a noted bee scientist describe the growth process something like " imagine a baby elephant growing into a fully developed elephant in (6) days.



If one sees eggs the larval stage will follow in three days and by day 9 the bees will be sealing the cell with a wax cap.



21 days later young adult bees will emerge from the cells.

The brood should be solid with very few cells open.

I always look at the number of frames that have brood on them to determine the value of the queen. Anyone keeping more than one hive will note that not all queens are equal. A good queen should have at least 8 frames of brood or more.

This first brood cycle can easily be demonstrated by the pictures that follow:

This is a very good frame of capped brood. Most of the brood on this frame is about the same age. One can still see some developing larvae (the white colored cells on the left side of this frame).

Otherwise, the developing brood on this frame are from approximately 10 days to 21 days old.

Do you have any idea of the number of new bees that will emerge within the next few days? Each square inch will produce 25 bees in this cycle. There are approximately 153 square inches of brood on this frame! 153 x 25 = 3,825 bees on just one side of this frame.

The outer ring of brood on this frame clearly shows the end of the cycle of brood on this frame. Once the first cycle of young bees is added to a colony's population, the queen returns to the empty cells to lay another round of eggs.

This is repeated throughout the summer into the fall.

A hive could possibly have 80,000 bees. As some bees die, others take their place.

The problem with beekeeping is sometimes a package or a nuc is sold with a queen that is untested. An untested queen could be a good laying queen but the reverse is possible – she could be a virgin or a poorly mated queen. Looking at a queen can not determine how good a queen is. A large queen with a big abdomen is usually considered an outstanding egg laying queen at first sight – the thinking is she is well mated. But during my time of keeping bees, I have seen large queens fail and I have seen some small queens do a very good job of laying eggs. I still prefer the larger queens.

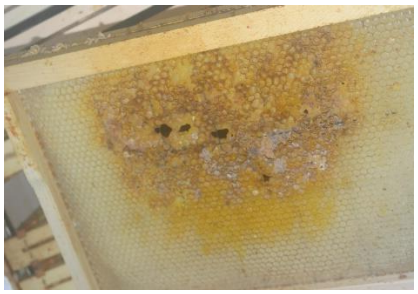
Some Problems with the queen in a new hive

The critical period of time for successful introduction and evaluation of the queen starts with the first week bees are put into a hive.

If a queen is not accepted and the beekeeper ignors opening the hive, the following pictures will give you an idea of what happens five weeks later when the hive is opened!







This was an actual case of a beekeeper buying a package of bees and asking me why there were no bees. He said he fed them and the bees were flying in and out of the hive. I asked how long has it been since he opened the hive. His answer "I put bees in the hive about a month ago and fed them but I did not open them because I thought everything was okay!" I was called because there was no activity of bees going in and out of the hive.

It is obvious that the bees tried to draw comb and they did store some of the food he was feeding them. But most of the bees in a package will be dead in five to six weeks after they are put into a hive. The bees put into this hive had no chance of survival. They for some reason had lost their queen before she started laying eggs. **This is an example of mis-management of a new hive of bees.**

Honey bees have a survival instinct. If they have eggs, they are capable of raising a new queen. They may even abscond (leave the hive) – some bees start looking for a new location the minute they are put into a hive. That is the reason experienced beekeeper with other hives usually place a frame of brood in a hive just started. Bees rarely abandon brood. Drawn comb with some honey will also hold new bees placed in a hive.

If I open my new hive, I should see some of the following things.

- Are the bees drawing new wax on the foundation put into the new hive?
- Look very carefully for eggs. If the bees are drawing foundation on a frame like this, the queen will move onto the comb and begin to lay eggs almost immediately.
- If you see eggs laid in almost every cell, you can assume the hive has a queen!

This is what new beeswax foundation looks like as it is being drawn. One must look harder at new wax comb because the light background often makes seeing eggs difficult.

The egg is the little speck of white at the bottom of the cell shown by the blue arrows. It takes a good eye to see eggs.

This is what one will see three to four days after the queen begins to lay eggs.

Larva is easier to see. This is the second step in the development of a worker bee.

If one sees both eggs and larva like shown here, one can assume the queen is in the hive and is doing well.

But things can go wrong. If the queen happens to be killed while a beekeeper is manipulating frames, the bees will within hours begin to look for a larva of suitable age to feed to become a new queen.

This is a new hive but if we look closely, we will see something we would not expect in a new hive

The bees have started building a queen cell near the top bar of the frame.

If a queen cell is being built in a new hive, it requires a careful check to see if any others have been started. A cell such as this is surrounded by cells with pollen and honey being stored. There are no eggs or larva anywhere near this single cell. It is a sign that the bees need a queen. Normally emergency queen cells will be found where young larva is found.

<u>A new hive should not be building queen cells</u>. Either of two things are happening in the hive.

- **The queen is missing or has died**. (This is the most serious situation a hive can find itself in and if no eggs or larva of the right age are available, the hive will be unable to raise a replacement queen.
- **The bees are planning on replacing the queen in the hive.** The queen may be laying eggs but this is called supersedure. For some reason or other the bees have detected a flaw in the queen's ability to lay eggs or that she is injured.
- Thus, the bees set about raising a few queen cells – not many and the new queen will replace the old queen. This happens often and for some period of time the new queen and the old queen may be found in the same hive at the same time.

If you are looking at only drone brood and maybe scattered eggs (often more than one egg to a cell) the hive is in trouble.

In cases such as this, the hive has laying worker bees. Laying worker bees can only produce unfertilized eggs which result in drones developing from their eggs.

It is very hard to requeen a hive with laying worker bees. I will address this problem in later articles but for right now, I would suggest moving some worker brood from another hive (the reason to have two hives). The bees if the population is large enough, might raise a new queen from the brood given to them. The problem is: The colony will have been set back so much that, the bees will be unable to build up and survive the coming winter season without a serious effort on the part of the beekeeper to save it.

The final step in the first cycle of brood rearing is capped brood.

All the capped brood on this frame will add to the colony's bee population. It takes approximately 8 to 10 weeks for a new hive to have the population needed to gather a good honey crop.

This is a photo of a new hive with many of the older bees from the package still making up the bee population in the hive**. These new bees are essential for getting this colony off to a good start.**