LEARNING HOW TO KEEP BEES

In today's world of Beetles and Mites

by Jerry Freeman
Hamburg, Arkansas
jfreeman1944@yahoo.com

Compared to today, beekeeping in the 1970's was easy! Back then I ran 25 to 30 hives for honey production and raised Queens for a commercial beekeeper. Honey production was literally a 3 step operation: reverse the brood boxes in March, add honey supers in April and extract in July. Over the years only one hive developed American Foulbrood and I promptly burned it. Since I re-queened in the fall, swarming was a minor issue. Life was good!

Job and family responsibilities forced me out of beekeeping in the early 1980's. I didn't bother to keep up with the industry literature and the news media ignored the problems that killed nearly half the honey bee colonies in the U.S. I had no idea how much beekeeping had changed.

Around 2005, a few of my friends asked me to help them with their beehives. They had formed the Ashley County Beekeepers Association and all were struggling to keep their bees alive and make a few jars of honey. I thought, 'Hey, this will be easy!' Little did I know it would take over 2 years of hard work to learn how to deal with today's beekeeping problems with any degree of confidence. (Ashley County is in the southeast corner of Arkansas on the border of Louisiana.)

Only a few of the members had done any research and those few had run into 'information overload'. Much of the information was confusing to them. Most articles dealt with a specific issue in great detail, making it hard to connect key elements and draw suitable conclusions. It took probably 6 months for me to realize that I knew no more than they did about the current problems of beekeeping. However, I had the advantages of prior experience and basic beekeeping knowledge. We began an earnest search of the internet, supply catalogs and The American Bee Journal for solutions. At first we had informal meetings and discussions. I soon began writing articles on basic beekeeping and leading the discussions. In the process, I fell in love with beekeeping all over again. My wife says I have a severe case of 'Honey Bee Fever'!

We quickly realized the members needed me to inspect their hives and suggest actions they needed take. At times we had 5 or 6 members gather to inspect a hive. Many of them needed to learn how to recognize sealed brood, capped honey, drones and other wonders within the hive. One member made it clear he wanted to know, "What am I looking for and what should I do about it?" That is our approach to beekeeping. I have to read through lot of scientific details when researching problems, but our 'How To' guides are focused on practical application with as few scientific details as possible. I have found that most beginners (and some old timers!) feel this way. They don't want to know about the life cycle of Varroa mites, they just want to know how to kill them.

From this beginning, we developed the following Hive Inspection Checklist and an explanation for each item on the list. The first inspection column is filled in for illustration. Refer to the check list as you read the explanations to see how each item is recorded.

HIVE INSPECTION CHECKLIST

HIVE NUMBER #4 **Dates:**	*3/21/08*					
Temperature	*72*					
Traffic at Entrance: High Med Low	*H*					
Bees Crawling on the Ground?	*N*					
Bees Bringing in Pollen?	*Y*					
Hive Beetles on the Lid?	*N*					
Feeder in Place?	*Removed*					
# Frames of Sealed Brood / % V	*6 / 90%*					
# Frames of Open Brood	*2*					
Any Sign of Brood Disease?	*N*					
See Small Larvae?	*Y*					
See Eggs?	--					
See Open Nectar in Combs?	*Y*					
Total Frames of Bees	*12*					
Total Frames of Brood	*8*					
Total Frames of Honey	*3*					
# Deep Boxes # Medium	*2 / 1*	/	/	/	/	/
# of Bad Combs	*3*					
See the Queen?	*Y*					
See Queen Cells?	*N*					
See Drones?	*Y*					
Temperament: Calm Avg Bad	*C*					
Medications Added or Removed						
Apistan A R	*Add*	*R -May 2*				
Check-Mite A R						
Terramycin A R						
Mite-A-Thol A R						
Fumagilin A R						
Formic Acid A R						
Bottom Board: Clean Avg Dirty	*Avg*					

COMMENTS: Date, Actions Taken, What's Blooming? Next Inspection Date? Action Needed?

3/21/08 - Population growing OK, Several frames with open nectar. Need to work at removing bad combs

Queen looks fat and energetic!

HIVE INSPECTIONS

To have healthy, strong, honey producing hives, beekeepers must make **inspections** to know the **conditions inside the hive**. Hive inspection is simply a term to describe:

- Taking the hive apart and making observations, then
- Deciding what needs to be done, *based upon those observations*

There are a number of things we need to look for when we inspect a bee hive. An inspection sheet helps keep things organized and allows easy comparison from one inspection to the next. Experienced beekeepers may find this check list too detailed, but that's really the point. It helps keep beginners and forgetful old folks like me from overlooking something important.

A**PPROACH** the hive from behind or from the side. As much as possible, stay out the bees' line of flight. The rule of thumb is to smoke the bees a little and smoke them often. Give them 2 or 3 puffs of smoke in the entrance and under the lid before opening the hive. After that, giving them 1 or 2 puffs of smoke across the frames before you remove each frame will usually keep them calm. Smoke under each box before removing it. If the bees get aggressive, put a LOT of smoke in the air. This will mask the alarm scent and some of the bees will seek shelter inside the hive.

HIVE INSPECTION CHECKLIST

HIVE NUMBER: Identify the hive **DATES:** Enter the date for each of 6 inspections

Temperature (These are general guidelines and not necessarily exact facts.)

Below 30^0 F	Open the hive only in emergency, such as to feed or remove chemicals. If feeding is necessary below 30^0 F, we must use dry sugar so the feed won't freeze.
Below 40^0 F	Open the hive only in emergency, such as to feed or remove chemicals. Bees cannot get far from the warmth of the cluster at below 40^0 F so feed must be placed directly above the cluster.
Below 50^0 F	At 50^0 F, the bees are loosely clustered. The hive can be opened but brood combs should NOT be removed. Side combs can be removed to look at brood combs, but must be replaced quickly to avoid letting the brood get chilled.
55^0 F	Bees begin to fly at 55^0 F, especially for cleansing flights. Honey bees will not defecate inside the hive unless they have Nosema – Honey Bee diarrhea. They will also begin flying to collect nectar and pollen if it is available. Hives can be opened, but care must be taken to avoid chilling the brood.
60^0 F	Complete hive inspection can be made, but brood combs should be returned to the hive quickly.
70^0 F	70^0 F is warm enough to completely disassemble the hive and frames for a thorough inspection.

Traffic at Entrance: High Medium Low

Low traffic at a time when you expect bees to be very active may indicate a problem inside.

High Traffic = 1 or more bees landing or leaving per second. We expect high traffic in mid-morning on a warm day when pollen and nectar are available.

Medium Traffic = 1 bee landing or leaving every 4 or 5 seconds. Cool weather, high wind or slow nectar flow may reduce traffic to medium. Also, some nectar flows are reduced in the afternoon which could slow traffic.

Low Traffic = 1 bee landing or leaving every 10 seconds or longer. This may be normal for existing conditions. However, in mid-morning on a warm day when pollen and nectar are available *we expect high traffic*. If a hive has low traffic when you expect high traffic, make a careful inspection for bee population, honey stores, open nectar, amount of brood, appearance of brood, beetles and anything else that might indicate a problem.

NOTE: If the hive looks OK after inspection, check it again the next day to see if traffic has returned to normal. If not, use a sticky board to check for Varroa mites. Treatment may be necessary.

Bees crawling on the ground?

This is another indicator of possible problems. It is normal to see a few dead bees in front of the hive. Some bees die of old age inside the hive and are removed by housekeeping bees. More than a dozen dead bees in front of the hive probably calls for a close inspection of the hive.

More than half a dozen bees crawling on the ground in front of the hive are an indication of sick bees. First, touch the bees with your finger or a twig to see if they can fly. If the bees do not fly, check their wings. If the wings are tattered on the lower edges, the bees are just worn out and there's not a problem. *If the wings are deformed*, there are likely Varroa mites in the hive. Even if the wings are not deformed, if the bees can't fly, we need to make a close inspection of the hive. We also need to make a mite count with a sticky board. Treatment may be necessary.

Bees bringing in pollen?

If the bees are bringing in many loads of pollen, it's a good sign of brood rearing and that all is well. Fewer loads of pollen do not necessarily indicate a problem. Very few or no loads of pollen at all when you know brood rearing should be heavy is cause for a close inspection of the hive. If there is little pollen available in the combs, you probably need to feed a pollen supplement so the bees will have the necessary protein for raising brood.

Hive Beetles on the lid?

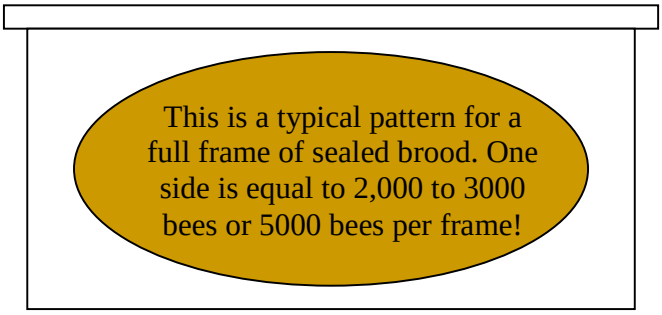
Normally, few beetles will be seen on the lid unless there is a heavy population of beetles. If ***any*** beetles are seen in the hive, a screened bottom board with an oil tray should be installed at once. (We designed a screened bottom board with a rear entrance and no ledges for beetles to lay eggs on – beetles and mites fall directly into the oil tray. I hope to show this in a later article.)

Feeder in place?

This is just information. If you need to feed the hive, you know whether a feeder is on it.

# of Frames of Sealed brood / % V (Brood Viability)

This is a measure of the growth of the hive and the performance of the Queen. The number of frames of sealed brood should increase from winter to the spring honey flow – from a small hand sized patch in early February to 8 or 10 frames in April. We have to estimate how many full frames of brood (both sides) all the patches add up to. We primarily want to compare the amount of brood to the last inspection, so use the same method of estimating each time. For example, 4 half frame patches equal one full frame.



The normal amount of brood will vary with the season. In our area there is very little nectar during summer and good queens reduce brood rearing. In October we feed light syrup to stimulate brood rearing to have young bees for the winter. We probably need 4 or 5 frames of sealed brood throughout October.

NOTE: If the capping on any sealed brood is sunken in, check it for disease. To check a cell, use a matchstick or twig to remove the pupae. If it doesn't look normal, get someone to check the hive for you.

Brood Viability is the percentage of brood that develops into healthy larvae. This is a measure of the Queen's genetic background. 'Spotty' brood has a lot of empty cells. To check brood viability, take a piece of paper or cardboard and cut a hole in it 2 1/8" X 1 7/8" square. Place the paper over an area of sealed brood. The hole will expose 100 cells of brood. Count the empty cells and subtract from 100 to get the percentage. (e.g. 100 – 11 = 89%) More than 85% viability is considered OK. If there are more than 15 empty cells, the Queen should be replaced.

Open brood?
Open brood in different stages of development (different sized larvae), gives us an opportunity to check the health of the brood. Healthy brood is white and looks moist. Estimate the # of frames of open brood and record on the check list.

Any sign of Brood Disease?
If any larvae is dark, looks dry or has dissolved into 'goo', there is some disease present. One or two cells may not be a problem, but a dozen cells of sick brood will require some action or treatment. Get someone to check the hive for you.

Small larvae?
This is just information. Small larvae indicate that the Queen has recently been present.

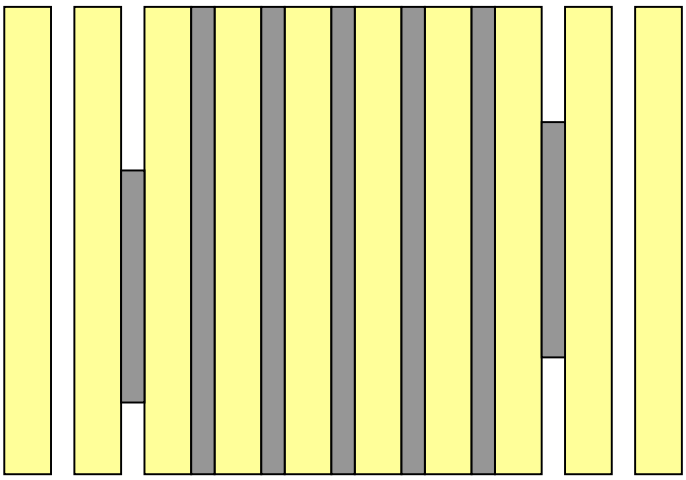
Eggs? If eggs are present, it's a good sign the Queen is OK even if you don't see her.

Open nectar in the combs?
Open nectar usually indicates fresh nectar. This means something is blooming and the hive is healthy enough and strong enough to collect it. We watch for this in late winter and early spring. The hive may have only 2 deep frames of honey, but if it has fresh nectar, feeding probably won't be necessary.

NOTE: The hive stores need to be watched closely in the spring because brood rearing consumes a lot of honey. If cold weather stops foraging or the nectar flow stops, the honey stores could disappear quickly.

Total frames of Bees
Since this is used only for comparison to the last inspection, we don't need a precise count of the bees. If we count the spaces between frames that are full of bees we can tell if we have more bees or fewer bees than at the last inspection. This will also tell us how many frames of brood the bees can cover. Take into account the difference in temperature. Bees crowd closer together as the weather gets colder. The same number of bees that covered 8 frames at 60^0 F may cover only 5 frames at 40^0 F. In the diagram, consider the frames as being yellow and the dark spaces as being full of bees. As a rule of thumb, it takes at least 3 frames more of bees than brood for the brood to stay warm. (The bees cluster on the brood and keep it between 92^0 F to 97^0!)

TOP VIEW OF THE FRAMES AND BEES



In this example, we would have 5 frames of bees and 2 half frames of bees. For total frames of bees, I usually don't count the half frames. If the next box has 3 frames of bees, I would count 8 total frames of bees. A total of 8 frames of bees can cover 5 frames of brood. *We need to compare the number of frames of bees to the number of frames of brood before adding an empty comb in the middle of the brood nest for swarm control.*

Total frames of brood?
We cannot count the frames of brood until the temperature is 60^0 F or above. Below 60^0 F, we can remove 2 side frames and slide the other frames over to see if they have brood. It is not necessary to have a completely accurate count. We want to see that there is a normal amount of brood for the season and conditions. In early spring, we also want to see that we have more brood than at the last inspection. When counting total frames of brood, count the total frames of open brood as well as the sealed brood. (Just add the frames of sealed brood and open brood on the checklist.)

Total frames of honey?
We want a good guess at the amount of food stores in the hive. There will be half a frame of honey here and a hand sized patch there. Estimate how many deep frames all of it would fill. Anytime honey stores are less than the equivalent of 2 deep frames we either need to feed the hive or inspect it weekly to be sure they don't run out.

# of Deep Boxes # of Medium Boxes
We want to work our hives down to 2 deep boxes for winter. Some beekeepers prefer 3 medium boxes because they're lighter and easier to work with. Too many supers and combs make it difficult for the bees to take proper care of the hive. Extra supers and combs should be stacked and stored with moth balls. Recording the # of deep and medium boxes will help us organize our hives for fall and winter. We may want to take boxes off tall hives and add them to short hives. We will often have to exchange frames between hives to accomplish this. *It is therefore critical that we keep our hives healthy so we don't spread a problem in one hive to other hives.*

Total # of Bad Combs?
This is a reminder to bring several good combs to the next inspection. If the bad combs are empty or nearly empty we need to replace them. So many of our members have bad combs that we're working on a method to induce the bees to clean out the bad combs so they can be replaced.

See the Queen?
It is always good to see the Queen. If the Queen has been marked, you can tell if it's the same Queen or a new Queen. The Queen's abdomen should be plump with eggs when she's raising brood – which is all year, except a short time in winter. Does she move 'gracefully'? If she has trouble moving, you probably need to replace her.

See Queen Cells?
Bees will build Queen cells to supercede (replace) an old or failing Queen. Bees will build Queen cells in an emergency – maybe you killed her during the last inspection. Bees will build Queen cells so they can swarm. Bees will usually build only a few supercedure or emergency cells on the face of the comb. Swarm cells are usually built near the bottom of the combs and may number over a dozen.

If you see supercedure or emergency Queen cells, close the hive and wait for the new Queen to start laying. That should be in 2 or 3 weeks.

If you see swarm cells, you have to decide what you want to do. Several options are described in a later article on swarming.

See any Drones?
Drones are a normal and necessary part of the colony. Drones are necessary to mate new queens if something happens to the old one. Bad or deformed comb can cause an over abundance of drones and should be replaced.

Temperament
Calm, Average or Bad. Colonies will have different attitudes on different days. If a colony has a consistently bad temper, you may want to the replace the Queen.

Medications Added or Removed
Writing an A or an R will show when a medication was added or removed. If a medication is added, I write the date for removal in the next box. (See example on the Checklist)

Bottom Board: Clean Average Dirty
For solid bottom boards, this is an indication of colony strength and hygiene. There will always be some amount of trash on the bottom board, but I've seen it half an inch deep and full of beetle larvae. Definite sign of trouble.

Screened bottom boards are a different situation. The trash falls to the ground or into an oil tray. Because of beetles and mites, screened bottom boards are recommended over solid bottoms.

Comments: Write the date at the beginning of the line to identify when the comments were made. Your comments may include questions or your opinions. Other examples are: Actions Taken, What's Blooming? Next Inspection Date? Action Needed.

LEARNING how to make a good inspection is the first step of beekeeping. Of course there were references to things not fully explained. Hopefully, this will peak your curiosity to learn more. We can leave the scientific details to the researchers, but we certainly have to know a lot about bees to be successful in today's conditions. This same inspection sheet will give us different information at different times of the year and different conditions within the hive. It takes a while to learn how to best react to the observations we make during the inspections, but healthy hives and good honey crops make it worthwhile.