“The success in keeping bees is found in their song.”

By Dana Stahlman

Keeping bees alive has been challenging for all of us. I am sure I am only touching the surface of a greater issue. "How do I keep my bees alive?"

- **Stress is apparent in the current times we are living.**
- **I believe we can better understand stress in honey bee colonies when we can compare it to problems we face in everyday life.**

A selection of stress factors for honey bees.

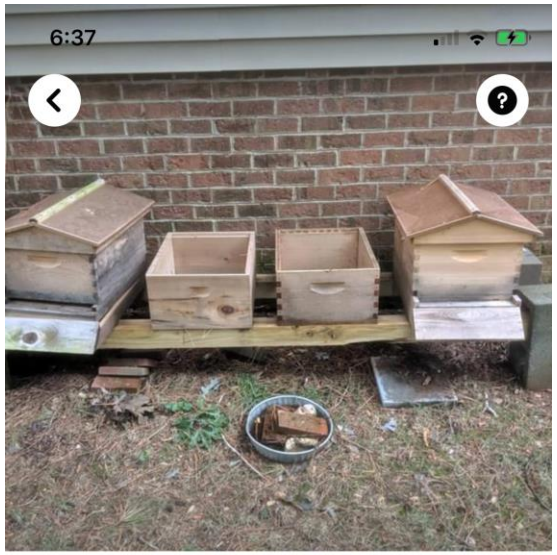
- **The behavior of honey bees depends on their age, the conditions within the nest (hive), and the environment in which they live.**
- **A change in any factor within a hive of bees will result in stress on the entire colony! In many cases, if the problem is not solved, the hive will die.**
- **Nature has provided the honey bee with a strong instinct to survive.**

As beekeepers we understand stress in our lives. Virus, politics, loss of job, house burning down and our bees dying! These things are called Stressors. Stressors in a honey bee's life can be chemical, environmental, external, internal, or human!

- **Lets take a look back for just a moment:**

- **"There has been an overall trending decline in honey bee population since the 1940's at which time 6.5 million honey bee colonies were being managed in the United States."** This is a quote from Melissa Gunter in a report written in 2014 in a report for Ecology Florida.
- **2006 -- CCD became a buzz word that entered the beekeeping literature.**
- **2010 -- USDA releases 2010 honey bee colony collapse disorder ...** 2010-12-usda-honey-bee-colony-collapse.html
- **2020 -- The number of beekeepers in the United States has dramatically increased since 2010. The number of new beekeepers has been increasing on the order of 3% a year due to the publicity based on the USDA Report.**
- **The number of individuals owning hives has increased while the amount of honey produced in the U.S.A. has declined.**

Each Year a number of beekeepers are quitting



Sold Beehives

$1

Listed over a week ago in Raleigh, NC

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Beekeepers are stressed out because their bees are stressed out!

I spoke to the beekeeper of this equipment and all he wanted to keep was his hive tool. He quit, he said, because his bees died. Moths took over the hives and his neighbor complained about the bees.

Beekeepers spend a lot of money to buy equipment and bees. I have asked a number of individuals "Why are you selling your equipment!"?

Reasons for quitting can be summed up with the answers I usually get from those selling used bee equipment.

- It cost too much to keep my bees alive.
- I didn’t get any honey!
- My neighbors complained!
- The bees I bought were nasty!
- I am getting older and can not lift boxes!
- They are more work than I thought!
- Most often, the answer is simply “My bees died!”

Honey bees are under a lot of stress, much of it man made!

- When I was young, someone told me not to think like a human. When you want the bees to do something, think like a bee!
- To understand this, one must have a good understanding of the biology that determines the behavior of honey bees.
- As a beekeeper, we want to provide honey bees with a good home and attempt to do what is good for them!

Beekeeper's have Many Decisions to Make!

- To keep bees, we as beekeepers make decisions such as what kind of equipment to put them in. That often leads to problems.
- To succeed a colony must have a good population of bees, a good queen, and be disease free.
  - They require above all else a dry well-ventilated home .
  - A food source and a place to store it as they prepare for the winter season.
  - Nature has for millions of years given them the instinct for self preservation.
  - To defend themselves they have evolved to have a stinger.

Honey bees are kept – not really domesticated!

- **What are some of the stress factors?**
  - **Bees are stressed because they are subjected to the wants and desires of their keepers and the environmental impact of what humans are doing to the world around them.**

Chemical

Loss of bee forage

Weather

Poor bee management – Unstable hive stand

Factors that can cause stress with in the hive:

- The loss of a queen
- One of the most common issues among the students that I mentor is with the queen. Often queens are poorly mated, are replaced by the bees, fail to return to a hive from a mating flight, or are killed by accident when the beekeeper visits the hive.
- A hive without a laying queen is in trouble. The queen lays eggs [many of them every day except during the early winter season. A hive without a queen is in a lot of trouble. A hive depends upon a strong bee population of good healthy honey bees to carry a hive through the entire bee season.

A hive without a queen is really stressed!

- The life for honey bees without a queen come pretty much to a stand-still until a new one is either introduced or they are able to raise one. This causes stress in a hive almost immediately.

- Too often when asked to look at a hive because they don't seem to be doing well, this is what I find. Once a laying worker starts laying infertile eggs in a hive it is almost impossible to get them to accept a new queen!

Beekeeping Management

Pulling frames from a hive always introduces the chance that the queen might be killed!

Thing we do to stress bees..

- **Manage bees to prevent swarms.**
- **Move them from one location to another location.**
- **Take away their honey.**
- **Replace the queen for several reasons determined by the beekeeper.**
- **Place bee hives close together in the same apiary.**
- **Over populate the area with honey bees.**
- **Place bees in areas with little bee forage, or water.**

What is stress to a honey bee?

It is the nature of honey bees to fill any empty space with comb as you see here. Are you aware of the energy and resources bees need to build this comb?

If the bee space rule is violated between bee boxes, they will build burr comb between the bottom of frames in the upper box and the top bar of the lower hive body. Often the comb will contain brood.

Major Stressors of Honey bees

- Diseases
- Environmental fluctuations – foraging areas
- Management Techniques
- Mites
- Pest of the honey bee --Small Hive Beetles, wax moth, ants, and four legged creatures.
- Virus
- Weather
- Humans

Stressful challenges to honey bees

Diseases: Any disease in a honey bee colony reduces the energy flow within the hive

The most contagious disease of the honey bee is American foulbrood. Best treatment – burn the hive and bees.

Those who are familiar with Chemotherapy know the patient often suffers some side effects of the chemicals used to treat a disease. In fact, the beekeeper becomes a component of the stress on the colony when chemicals are used.

Think of the area where you live as the community your bees will visit day in and day out.

Environmental fluctuations – foraging areas

Have you ever searched the area where your hive/ hives are located with a google map search?

How many other hives are sharing this area with your bees?

Are water sources available?

Are any environmental issues such as: hazardous waste, heavy traffic, agri-businesses [pig farms, orchards, feeding lots, chemical applications for insects] or angry neighbors near your apiary location?

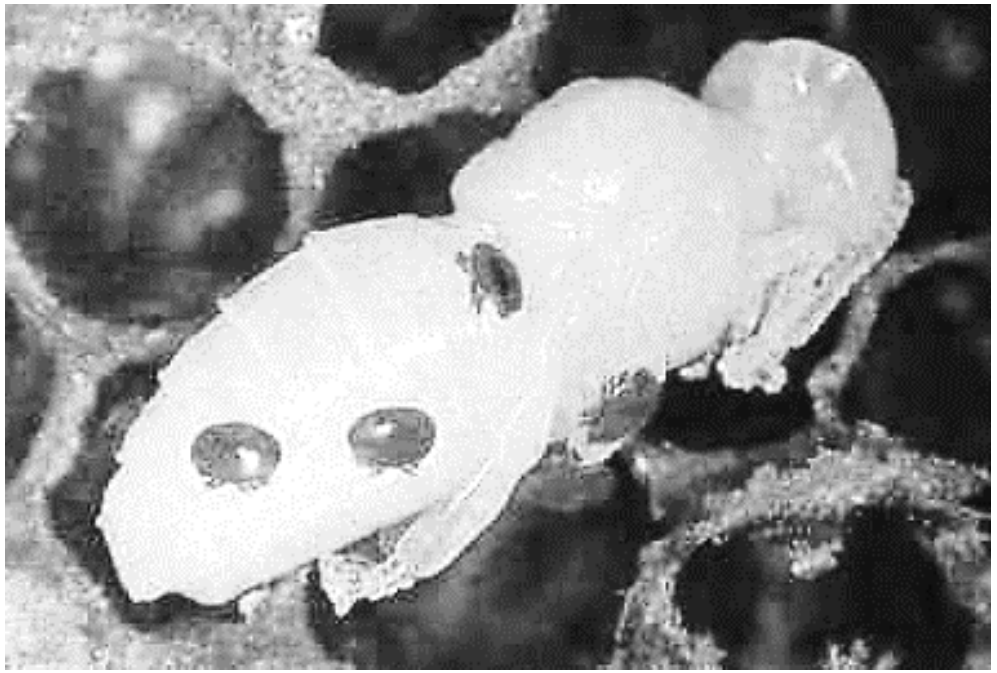
An area two miles out from your hive/hives may have stress factors that will impact your ability to keep honey bees successfully!

For example: A rather large hog operation was feeding molasses's with feed that also contained biological contaminants. **Bees love molasses!** To fight the bees the farmer sprayed the hog lot with Permethrin. Permethrin is a strong chemical that kills ticks, mosquitoes, chiggers, mites, honey bees and more than 55 other kinds of insects on contact. Permethrin is odorless. I was at a loss for why my bee populations were declining until I found and talked to this farmer.

Varroa Mites

These pictures are not very good but show what hygienic bees do when they encounter a Varroa Mite. Some attack the mite as shown here. A term “ankle bitters” has been used to describe this behavior.

Varroa Mites



A hive of honey bees usually will have Varroa mites present. As mite populations increase the bees will become extremely stressed. A point will be reach when the damage they cause, will lead to the death of the bees in the hive.

Varroosis is the actions of Varroa mites feeding on honey bees. This subjects the hive to other issues such as virus infections.

Wax Moth

Wax Moth
Considered a problem usually with weak hives.
Like the small hive beetle, it can do a lot of damage but the moth is a constant visitor to bee hives and lays eggs which develop into larva that build tunnels as shown here and pupate into cocoons shown to the right. When one sees it in the late stages, the hive is usually already dead!

Ants

Ants are more of a problem for beekeepers than the honey bees.

In this situation, the beekeeper caused an ant problem by using a jar feeder above an inner cover lid protected with a box and top cover. The ants found a way into the feeder jar!

It provided a perfect situation for ants to get food and the ant queen to begin laying eggs. Note the eggs laid on the inner cover.

Small Hive Beetle

The small beetle is black and can be found moving rapidly inside the hive when exposed to sun light.

The Larvae may be mistaken for wax moth larva but they do not spin cocoons as the wax moth larva and leave a slime trail within the hive. They can make a complete mess of a hive which can result in the loss of comb in the frames and loss of honey crop. <u>This beetle seems to prefer weak hives especially queen less hives to do its damage.</u>

Honey bees will herd small hive beetles in a hive away from brood. They will be noticed mostly on the bottom board and inner cover when a hive is opened. They will run and hide in the bottom of open worker cells and are hard to remove by hand.

Four legged creatures

Evidence of matted grass and bare ground in front of a hive indicates the hive is being bothered by predators such as skunks.

Honey bees are sought out by these animals. Some such as mice will enter a hive for protection from the elements of winter. Skunks will eat bees, and bears – they will do the most damage.

If a hive is visited by any predator, it may become very defensive!

Weather can be a factor when working a Colony of bees.

Bees can become very aggressive in certain weather conditions. They seem to know when a storm is about to arrive.

- **Any slow down or end to a nectar/pollen flow is cause of great stress on a colony of honey bees.**
- **Bees react to hot or cold weather in different ways. Often in hot weather, water can be made available to bees, weak colonies could be equipped with robbing screens, and shade might be provided if needed.**
- **High winds can cause top covers to blow off hives or worse, high winds can blow a hive over.**

Viruses

I took this picture from [Honeybee viruses | The Evans Laboratory]

Dead bees or drunken behavior in honey bees may indicate a hive is infested with viruses.

Honey bees can be infected with many viruses. Sacbrood virus was the first bee-infecting virus to be described in the scientific literature in 1913, and approximately 20 more viruses were subsequently described based on their symptoms in bees. With new molecular biology tools, it is now possible to use DNA to identify viruses infecting bees, even if there are no symptoms. A recent screening of honey bees collected in Pennsylvania found that they were infected with several viruses including; Deformed wing virus (DWV), Black queen cell virus (BQCV), Sacbrood virus (SBV), two Paralysis viruses, and more.

Humans induce stress to colonies of honey bees

When we discuss problems with honey bee survival, some of the most serious stress factors are caused by humans.

- **Farmers are practicing mono crop culture.**
- **Homeowners are spraying herbicides to kill weeds beneficial to honey bee survival.**
- **Pesticides are used without following correct label instructions. [This includes beekeepers]**
- **The removal of vast areas for housing developments results in the loss of plant habitat .**
- **The movement of bees leads to transmission of disease (mites, viruses, small hive beetles) just to name a few.**
- **And beekeeping management can be very stressful to a hive of bees.**

• Inspect hives to do the least amount of harm.

A beekeeper trying to find the queen in this hive.

Each hive inspection sets the hive back by some period of time.
Some have expressed the idea that it may take bees several days to a week to correct the damage we do in a single inspection.

Just opening the hive to pull the top cover off is enough to interrupt what the hive was doing and it is especially costly when foraging bees are seeking nectar and pollen sources.

Inspect only when you have a purpose in mind and do not keep a hive open for long periods of time.

Final Thought – I was interested in this statement made many years ago by an older beekeeping friend. I would like to pass it on to you!

"To know honey bees is to work with them – not read about them.
Stop, Look, listen!"

Visit the hives frequently and when problems are identified,
Do something about it immediately.

He added, "The success of keeping bees is found in their song."