

**Stahlman Beekeeping
Notes for 2022
The Winter Cluster**



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This week has been mild fall days with temperature ranges here in North Carolina between 39 and 80° F. Our bees have been bringing in pollen (light yellow and orange). Bees are robbing like crazy which indicates to me that they are finding something but not enough of it.

My thoughts now are about winter survival. We as beekeepers are optimists. That is until we hear of a beekeeper with equipment for sale. The story of failed beekeepers goes back to the beginning of man trying to keep bees alive. The real picture of keeping bees is how many hives will be around come March or April?

Bees have survived and will continue to survive (maybe not all my bees) because they have developed some unique survival techniques. Honey bees are able to survive because they developed as a social group rather than as individual bees.

A single honeybee biologically is not built to survive or behave as an individual. Honeybees are dependent on each other and that begins with the division of the honey bee family. Queen honey bees are dependent on worker bees to feed brood, gather nectar and pollen, clean the nest, protect and defend the colony. The problem is the worker bee is a female unable to lay fertilized eggs. The queen depends also on finding a mating partner or partners to produce fertilized eggs. Thus, one bee cannot exist without the others.

I gathered up some interesting things that honey bees do in order to survive.

Most important is the adaptation to forming a cluster. We see it in swarms, in our hives in various shapes during seasonal changes, and the critical period of winter.

Another factor is the bee population is regulated by seasonal changes in weather. It follows the cycle of plant life. Populations increase with food available and decrease when food is not available.

Apis mellifera (our honeybee) has evolved with the adaptation for storing honey. *Apis* is Latin for "bee" and *mellifera* is Latin for "Honey-bearing or producer of honey".

Eva Crane, wrote a number of books and was considered a world authority on bees - she commented about the unique spacing of comb within the nest. I have in one way or the

other never given much thought to the spacing of comb in the upper part of a colony's honey storage comb. I have always known the honey super frames in a 10 frame box can be reduced to 8 or 9 frames rather than 10. She mentions in her book "The Archaeology of Beekeeping" that in nature bees construct their nest downward vertically from the roof. She reports that the spacing (the bee space) shows a greater tolerance between the honey-storage comb than the area where the brood is raised. As bees consume honey stores in the upper comb area, the bee space increases. Could this mean that the cluster within the space generate and distribute the heat generated by the cluster more efficiently? I am not aware of any studies that would concern itself with the spacing of frames and the bee space for better overwintering. If any of you are working toward a research project, this might be something of interest to you.

In her time line for the evolution of honey bees, she gives the following guide –

150 - 100 million years -- Flowering plants have existed and produced nectar and pollen.

50 – 25 million years -- Solitary bees have existed – Also early primates.

20 – 10 million years -- Social bees have produced and stored honey.

For a few million years -- man has existed and has eaten honey

For the last 10 thousand years – Records have survived of man's exploitation of honey.

Isn't it interesting that in the last 300 years, the progress in keeping bees has developed into an art of hive design? Prior to the last 300 years, bees were kept in man-made hives as shown in Egyptian scenes, Roman drawings, and books published in the middle ages. The skep is one we are familiar with! But bees for the most part were left to their natural instinct to build comb within the container they were housed.

Bee books published prior to the introduction of frames in the hive usually mention the attempt to save bees from the sulfur pit. The effort to save bees began well before modern day efforts.

Some facts about the honey bee cluster that are critical to bee survival

- 1) As days become shorter and cooler, honeybees begin to form the winter cluster.
- 2) A cluster is ball shaped – exposing less surface area to the cold temperatures.
- 3) The bees store honey and pollen in and around the brood area.
- 4) As this brood area is reduced, honey is stored in cells vacated by newly emerged adult bees. If there is no additional room to store honey, the brood nest becomes congested.
- 5) Colonies become more aggressive. They will search for food sources and rob from other colonies that cannot defend their hive.

- 6) The bees move the cluster upward to honey stored above. Bees can die out during the winter season with honey stored away from the cluster area. Usually the honey stored near the outside walls of the hive is unavailable.
- 7) Honeybees can hold their excrement for a very long time and slow down their metabolism.
- 8) On warmer winter days, bees can break the cluster to fly and relieve themselves.
- 9) They normally move the cluster upward to honey stored above the brood.
- 10) The body temperature of the honeybee is not constant and depends on the temperature within the cluster to survive cold weather. This is called thermoregulation that allow the honeybee to endure long confined conditions. Honey bees do not hibernate!

Charles Butler described what he considered the ideal cluster area in “The Feminine Monarch” published in 1623. This was just 399 years ago.

He was a skep beekeeper. His drawing shows an oval shape some 17 inches high by 15 inches across. He wrote, “The Bees do best defend themselves from cold when they hang round together in manner of a Sphere or Globe (which the Philosophers account the most perfect figure) and therefore the nearer the Hive commeth to the fashion thereof, the warmer and safer be the bees.”

How close does his figures come to the size of the current double deep Langstroth hive? He also mentioned that “the hive and the top must rise some two or three inches higher than the just form of a globe.” I assume this is for better ventilation for the cluster of bees below.



This is a winter cluster. What damage is done to this hive by separating the cluster on a cold day?

- 1) This disrupts the core heat within the cluster.
- 2) The disturbed bees will attempt to fly, begin to move and do not calm down quickly.
- 3) When the top box is put down, many bees will be crushed.
- 4) My rule is: Get the bees ready for winter before winter arrives. Winter as you will see in these notes will be a time for you to relax, read, attend meetings, and give the bees a chance to do their thing. They store honey for a reason! They arrange the nest for winter survival. They have been doing this for 10 to 20 million years!

Just an added note: I am including the pdf file I wrote many years ago when I had a copy of Charles Butler book written in 1623. The English language of the time has changed a bit. As written, it was hard to read and many words had little meaning to the modern reader.

So I sat down during the winter of 2004 and translated the entire original edition of The Feminine Monarchie: Or The Historie of Bees into readable modern English.

I found Charles Butler to be an extra ordinary person. The introduction to my study of Butler covers 4 pages of background and another five pages deal with beekeeping during his lifetime. If one is interested in keeping honeybees in skeps, this book will be most useful still 400 years or so later in how to manage bees.

The text of his book is included in the pdf. As I typed "The Feminine Monarchie or The Historie of Bees" in the pdf document, I changed a number of terms he used into modern English to make it easier to read and understand. The document also contains a section of 4 Appendix items including The Millissaeen Calendar, A Dictionary of Old English Words, References used by Butler, and a list of books written by Charles Butler. It is 200 pages + long and If you want to skip the first 31 pages, the actual text of the book begins on page 32.

I hope it makes for some winter reading. One striking feature of Modern Beekeeping is the lack of interest in the history of beekeeping. I hope some of you during this winter season will check out Cornell's Mann Library which has a number of very old beekeeping books available.