

# HONEY BEE COLONY AUTOPSY...An Exercise In Problem Solving/and Guide

by Lynne Gobeil

Honey bees are an essential part of our ecosystem and as beekeepers, it is important for us to understand the reasons behind the death of our colonies. Honey bees can die from a variety of reasons or a combination of reasons. Sometimes the death is due to poor management or factors outside of the beekeepers' control. Possible factors leading to the demise of a colony may include varroa infestation and their viral complex, disease, cold, starvation, queen failure, condensation, pests, and pesticides. Performing a hive autopsy may help to understand why a colony has died.<sup>1</sup>

**Preparation for the Autopsy Process** (if the autopsy cannot be done right away, close up the hive to prevent robbing and spread of disease to other colonies)

Remove the hive to a well lit location where you will do the autopsy.

Before starting the autopsy, it is important to gather all the necessary equipment. This includes a clean surface to work on, a sharp knife, tweezers, a magnifying glass, flashlight, toothpicks, gloves, baggies for samples, a notepad to record your findings, newspaper or a drop cloth to cover the floor and work surface and a camera (you may not need all the items, but helpful to have on hand). If you are fairly new to beekeeping, you may want to find an experienced beekeeper to discuss your observations as you assess your hive. Autopsies can be done as a club activity.

**Begin with identifying the time of year when you last saw the colony alive.**

The time of year when a colony dies can help guide you to the cause. Typically,

colonies that die during the summer do so from queen, brood or food issues. Colonies that die in the fall are possibly due to varroa mites and their viral complex and winter deaths most likely from excess moisture, starvation, cold and varroa mites/viruses.<sup>1</sup>

Examine the hive starting at the top and work your way down frame by frame to the bottom board looking for the unusual, note and record your findings.

Guide your investigation with the following questions:

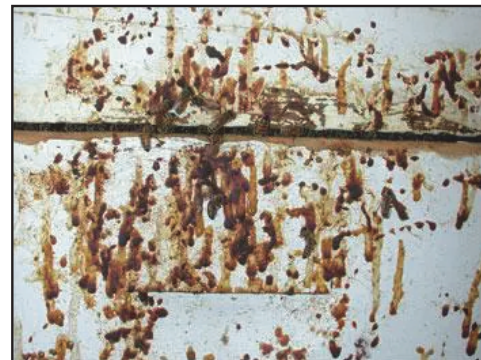
## Outside the Hive

(Note before removing the hive from its location if you can)

- Are there dead/dying bees outside the hive? Describe what you see.
- Is there dysentery?
- Is the hive located in a sunny location or mostly shaded?
- Is the hive ventilated properly?
- Is there protection from the wind?
- Are there any scratches or chew marks on the outside or on the ground?

## Inside the Hive

- Is there an unusual odor when you open the hive?
- Is there dysentery inside the hive?
- Do the frames, hive sides and inner cover appear wet?
- Are there cells of capped honey?
- Are there cells containing pollen?
- Are there white varroa feces on the frames?
- Is there any evidence of pests, damage to the comb?
- Is there any evidence of robbing? Ripped open cells?



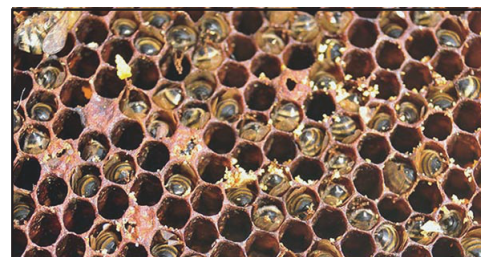
Online photo from mountainsweethoney.com

## Brood

- What is the brood pattern (solid/spotty)?
- Is there capped brood?
- Is there open brood?
- Is the brood primarily drone?
- Are there queen cups/queen cells?
- Describe the appearance (color and condition) of the capped and open brood.
- Does it look melted?
- Does the brood have an odor?
- Are there holes in the cappings?
- Does the brood string out and snap back when lifted with a toothpick?
- Is the brood close to food?

## Bees

- Are the bees head-first in the cells?
- Are the bee's tongues sticking out?
- Are the bees greasy, hairless, black looking?
- Is there deformed wing or K-wing?
- Are there stunted abdomens?
- Are the bees moldy?
- Are the dead bees primarily inside or outside of the hive?
- Is there a group of tightly packed bees on a frame close to honey?
- Are there small groups of bees scattered on the frames?



Online photo from backyardhive.com

## Bottom Board

- Is there an abundance of varroa mites?
- What is the condition of the dead bees? Healthy?
- Does it look like the whole hive is on the bottom board or very few bees?
- Is there any evidence of pests? Broken bee parts, piles of heads, wings, legs and feces, or nesting?
- What else do you see on the bottom board?<sup>2</sup>

## What are your Conclusions?

After completing the autopsy, it is important to record all your findings in a notepad. This will help you keep track of any patterns or trends in your colony deaths. It will also be useful in identifying potential issues and taking preventive measures in the future. Conducting a dead hive autopsy is an important step in understanding the reasons behind the death of a honey bee colony. It not only helps us identify potential threats but also enables us to take necessary actions to protect our bees. As responsible

beekeepers, it is important to conduct autopsies and take necessary measures to ensure the health and well-being of our honey bees.

It is important to do a bit of homework before you begin the autopsy of your hive. I've listed a few resources to help sharpen your skills of observation and to assist you in interpreting your data. Additionally there are resources on seasonal beekeeping and a review of honey bee diseases and pests.

## References

- 1 Lund, Jennifer. "How to Autopsy a Honey Bee Colony." Maine.gov
  - 2 Pride, Peggy. "Dead Hive Autopsy...an exercise in problem solving." Worksheet
- Lund, Jennifer. "Honey Bee Diseases." Maine.gov
- Lund, Jennifer. "Honey Bee Pests." Maine.gov
- Lund, Jennifer. "A Beekeeper's Calendar." Maine.gov

## Resources

Aurell D, Hoepfinger B, Sallmann B, Slater R, Williams N, Wyns D. 2019. *Diagnosis and Treatment of Common Honey Bee Diseases*. Second ed. Bee Informed Partnership.

Pernal S F, Clay H. 2013. *Honey Bee Diseases & Pests*. 3rd ed. Canadian Association of Professional Apiculturists. USDA-ARS Beltsville Bee Research and Diagnostic Laboratory. [ars.usda.gov](http://ars.usda.gov) (Lab to send samples for disease testing, there may be no testing charge).

"Honey Bee Health Coalition Best Management Practices."

[Honeybeehealthcoalition.org](http://Honeybeehealthcoalition.org)





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