Comb Management

By

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Having a hive with good comb is almost as important as having a hive with a good queen

Part 1 An introduction to Frame Management

Honey bees are masters at building comb. Bees create comb through a precise, cooperative process using wax secreted from their own bodies.

Honey bees are born with an instinct to build comb used for brood rearing and food storage.

This is called Festooning

Wax cells are built by honey bees and the nest they create is shown below.

Both views here are looking up at comb being built.

Comb is built from the top down but bees always provide a space between layers of comb.

We get involved in this process because bees can adjust to our desires to have nice straight comb built in frames provided to them as long as we follow a few rules.

This is a standard deep Langstroth frame with cells being constructed on plastic foundation.

New wax comb is white. It will turn yellow and then brown as it ages.

Good comb is important for colony health and growth

If cells are built correctly, the combined number of worker cells on one side of a frame will contains about 3,200 to 3,500 worker cells depending on the manufacturer and cell size. 6000 + cells on both sides.


One frame can produce over 6,000 bees in a 21 - day period and support population growth.


A Frame like this offers a queen fewer cells to place eggs and will most likely contribute to congested brood -- one of the leading causes of swarming.
This comb is not suitable for raising brood! All comb is dark and likely contaminated. Cell sizes vary considerably.

Comb Management

Comb management is the deliberate inspection, rotation, replacement, and organization of the wax combs in a honey bee colony to keep the colony healthy, productive, and resistant to pests and disease. Each time a frame is removed from a hive, the usefulness of the frame should be considered along with other things.

Honeybees are architects. By instinct, they build comb to provide strength for the nest and fill empty space with comb and propolize small openings resulting in problems for the modern bee beekeeper.

Here are a few examples how honey bees react to violations of the bee space in their hive.

Removing frames from a colony of bees is impacted considerably when comb is built in this fashion by bees

This is new beeswax wired foundation. The problem with this frame is not the frame or the foundation. Comb management must rely on good comb management from the beginning! A colony's success is directly related to the bee population required to build comb.

Frame management includes comb storage. If comb is not properly stored in hot weather conditions, wax moth can destroy a good frame like this in a matter of days.

Frames no matter how new, needs to be examined for defects and problems. Frames like this should be replaced.

This frame shows a problem when a frame is not wired. Hot temperatures make wax soft and when comb holds honey, warm temperatures causes the comb to lose its shape especially if it holds stored honey.

Does anyone have a question?

Why are bees dying in such large numbers?

Has anyone mentioned that maybe old comb that accumulates pesticide residues and pathogens in your hive could be a contributing cause?

This bee is returning to its hive with more than pollen and nectar! Because foragers visit flowers, water sources, soil, and tree surfaces every day, they can unintentionally transport a variety of contaminants that accumulate in the hive, especially in comb wax.

Pollution can affect honey bee health both directly and indirectly. Foraging bees can pick up contaminants from the air, water, soil, and flowering plants near by areas and transport some of these materials back to the hive. Comb in the hive is contaminated and this contamination builds up over time!

Damage to the hives of bees goes beyond just replacing bees in these hives!

Maybe you have never seen a bee kill. These bees did not die from mites! The hives in this bee yard were located near a field being sprayed with insecticide.

These compounds can accumulate in beeswax over several years because wax is highly absorbent.

Clearly no bees have been on this comb. It was taken from a dead out colony. Wax moth have not completely destroyed it. **Would you give it to bees to clean up?**

How about this frame currently being used in a hive? Should it be replaced?

Research has associated chronic pollution exposure to bees with:

- Reduced learning and memory.
- Impaired navigation.
- Lower queen and drone reproductive success.
- Shortened worker lifespan.
- Increased susceptibility to diseases and parasites.
- Reduced colony productivity.

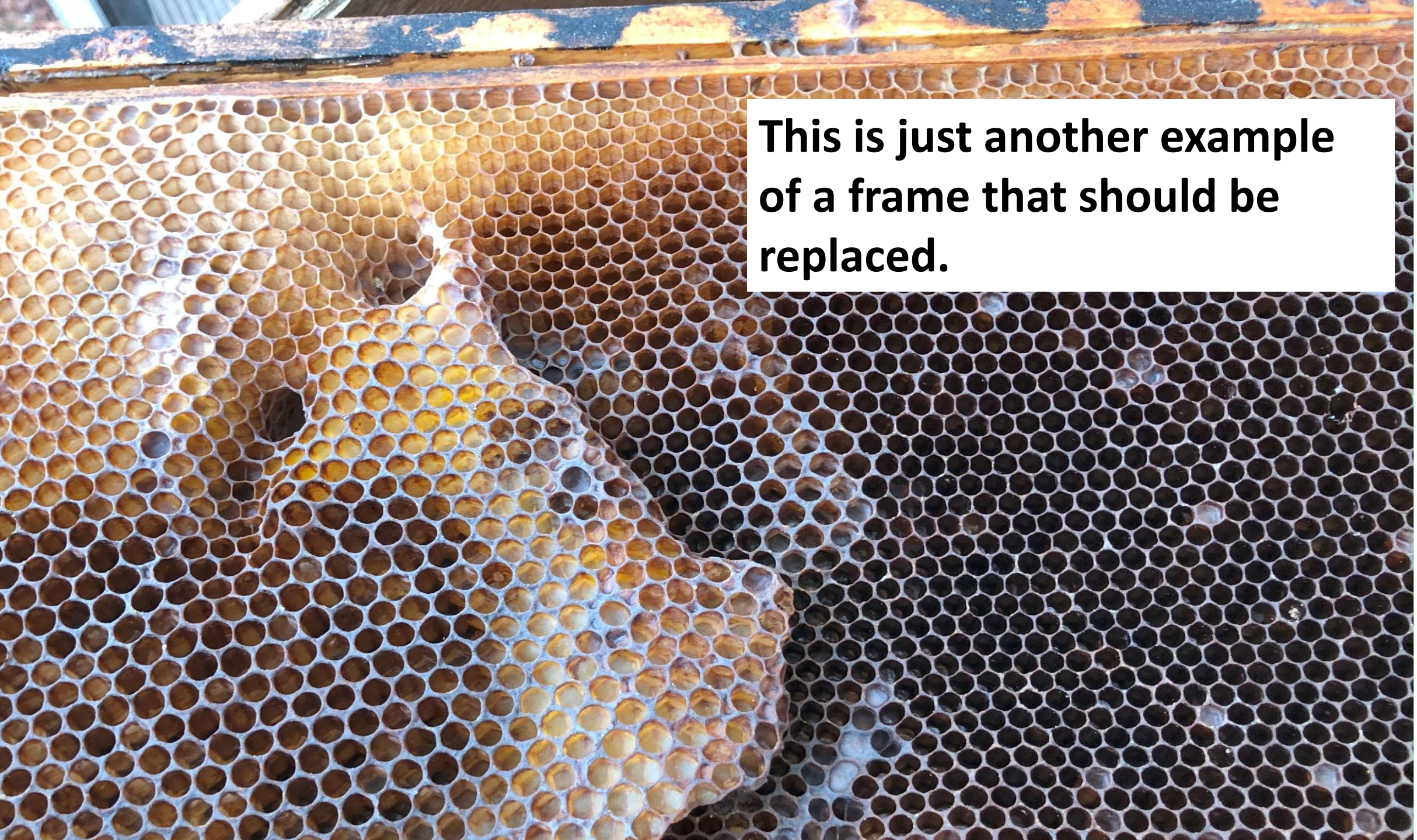
Old comb has tale-tale signs to help decide if it should be replaced.
The photo shown here makes the job easier because drone brood has reduced the number of worker brood cells considerably. Typical of old comb, the bottom bar has old queen cell cups indicating a colony using this comb swarmed in years past.

The color of the comb is very dark – not quite black. Old queen cell cups.

Identify the darkest, oldest brood frames.

1.Remove one or two old frames at a time.
2.Insert a frame with wax foundation or a starter strip adjacent to the brood nest—not at the outside edge if temperatures are still cool.
3.Once the new comb is drawn and the queen lays in it, remove another old frame.
4.Repeat until your yearly replacement goal is reached.

Travel stain and propolis is a sign that this frame should be replaced because of its age. If found late in the season, a frame like this can be moved to an outside spot in the brood chamber to be replaced in the spring.


This is just another example of a frame that should be replaced.

Air Pollution – Just something to think about

Bees can pick up:

•Soot, fine particulate matter, industrial dust, vehicle emissions and more found in our air. Beekeeper in the U.S. have been reporting problems with smoke in the air from multiple fires in Canada and our own country.

Chemicals used in bee hives to fight varroa mites can be spread by bees walking on the surface of wax. Bees can inadvertently transport: bacteria, fungal spores, and viruses from colonies infected with problems such as these. Bees walking on wax (often called travel stain) can transfer these compounds. Travel stain is something that accumulates over a period of time causing wax to turn brown to black.

Bees wax is highly absorbent.

A Plan:

Comb management plans should include a systematic schedule for replacing old, dark brood comb with new comb. Old comb accumulates cocoons, pesticides, industrial pollutants, heavy metals, spores, and other contaminants over time, while cell size gradually decreases from repeated brood rearing. Regular replacement improves colony health, brood quality, and honey production.

Discussion: Feel free to ask questions and make comments.

One more slide

Many commercial and experienced hobby beekeepers replace **20–25% of brood comb each year**.
This means:

- **5-frame brood box:** Replace 1 frame annually.
- **8-frame brood box:** Replace 2 frames annually.
- **10-frame brood box:** Replace 2–3 frames annually.

At this rate, every brood frame is replaced approximately every **4–5 years**.