

*“For want is nexte to waste, and shame doeth synne ensue.”*

– Richard Edwardes (1576)

I once saw a You-Tube beekeeping genius show how to install a package of bees into a dead-out top-bar colony. “First,” he said, holding up a bar with fully drawn-out comb, “we need to get rid of all of this old comb.” He proceeded to cut and scrap off all of that comb, the life’s work of countless thousands of honey bees. I almost cried.

When new people move into an old house, do they typically tear it down first? It cost a whole lot of time and money to build that house, time and money that could have been used for something else. Only someone with more money than sense would destroy a perfectly good house instead of reusing it. The same goes for old drawn comb.

The fuel for honey bees’ wax glands is honey. It is said that it takes something like six to eight pounds of honey for the bees to make a pound of wax. At high-dollar Piedmont Triangle prices, that’s around \$120 worth of honey for a pound of drawn comb. Shouldn’t we treat that comb with a bit of respect?

Of course, just as an old house may have a rotten foundation and a collapsing roof, extremely old comb may be so disgusting that the bees don’t even want to walk on it any more. That comb should go into your wax melter (although it actually doesn’t have much genuine wax remaining – it is mostly old bee cocoons and propolis). That’s not what we are talking about here. I assume readers can tell the difference between “disgusting” and “not disgusting”.

Saying “save that comb!” is easier said than done, but it is still pretty simple. The first step is to understand that the type of comb matters. Is it comb from honey supers that has never been used for brood rearing (pure wax), or is it brood comb that has pollen, old bee cocoons and shed larval skins in it? Comb in the first category can be very easy to store while comb in the second requires effort. We can tell which is which by the comb’s color: light yellow is pure wax,



Left neglected, comb that isn't protected by honey bees will be transformed into webbing, moth frass (poop), moth larva and pupa. The only thing salvageable here is the wooden frame.

pretty much anything else has been used at one time or another as brood comb. Fun fact: wax moths cannot survive eating pure wax – it doesn’t have sufficient nutrition. So pure wax is generally safe to store, with respect to wax moth damage. Ease of storage is one of several reasons that it is important to ensure that our queens don’t lay in our honey supers.

On the other hand, brood comb, dark with old cocoons, the shed skins of molting larva, pollen and baby bee poop, is meat-and-potatoes to wax moth larvae. Special care must be taken if that comb is to be stored for reuse.

## Preparing brood comb for storage

### Para-Moth crystals

The old textbook way to store brood comb is to stack boxes, with their frames, to make a fumigation chamber, then put paradichlorobenzene (PDB) crystals (the approved product name is Para-Moth) on top of the stack. Important: only use PDB crystals -- never use naphthalene moth balls that are commonly found at Wal-Mart and elsewhere.

The [EPA label](#) for Para-Moth contains detailed instructions on how to properly stack boxes to be fumigated. A few very important things to note include:

1. Stacks of boxes must be sealed at the bottom and at joints to prevent the gas from escaping.

- Paradichlorobenzene kills wax moth adults and immature stages, but not eggs. Therefore, comb must be constantly exposed to it while in storage to kill larvae that emerge from eggs.
- Honey bees exposed to PDB will die, so treated comb must be aired out thoroughly before returning frames to hives.
- Crystals must be reapplied every two to three weeks as they evaporate.

### B402 Certan

A much easier, much safer (for bees and people), very effective alternative to paradichlorobenzene is B402 Certan, a product that contains *Bacillus thuringiensis* subspecies *aizawai* strain ABTS-1857. This is a bacterium that exclusively feeds on the larvae of lepidopterans (moths and butterflies), and is incapable of harming honey bees, humans or our pets (unless we have a pet caterpillar). Empty comb that is to be stored is sprayed with a solution that the beekeeper mixes from the concentrated product. Only a single treatment is needed.

An important consideration with B402 Certan is that once the concentrate has been diluted in water to create a 5% solution, the product should be applied within three days. Otherwise it loses its effectiveness. Therefore, the user should only mix up the exact amount that is needed for the frames that are being stored. The [EPA label](#) very considerably includes a table that explains how much concentrate is required in order to treat how many frames.

Note that B402 Certan only kills wax moth larvae, but that's fine since the larvae are the only destructive stage of the pest. See "[A New Old Tool to Fight Wax Moths](#)" for a detailed description of this safe and effective weapon against wax moths.

### Freezer

A 100% effective way to kill all phases of the wax moth (eggs, larva, pupa, adults) is to put

|                | # Frames | Water    | B402     | Total 5% Spray Solution |
|----------------|----------|----------|----------|-------------------------|
| Deep Frames    | 10       | 9½ fl oz | ½ fl oz  | 10 fl oz                |
|                | 100      | 3 Qts    | 5 fl oz  | 3¼ Qts                  |
|                | 1000     | 7½ Gal   | 1½ Qts   | 8 Gal                   |
| Medium Frames  | 10       | 6½ fl oz | ½ fl oz  | 6 2/3 fl oz             |
|                | 100      | 2 Qt     | 3 fl oz  | 2.1 Qt                  |
|                | 1000     | 5 Gal    | 1 Qt     | 5.2 Gal                 |
| Shallow Frames | 10       | 5½ fl oz | ¼ fl oz  | 5.5 fl oz               |
|                | 100      | 1 2/3 Qt | 2¼ fl oz | 1¾ Qt                   |
|                | 1000     | 3.6 Gal  | 0.9 Qt   | 4.5 Gal                 |

The EPA label for B402 Certan includes a mixing chart to avoid spoilage and waste of product. The diluted solution must be used within three days.

frames in a freezer. Regular household freezer temperature<sup>1</sup> will do it, no problem, as long as the freezer is in good working order. The time it takes to kill the pest isn't really very long (20°F for five hours is sufficient), but I leave my frames in the freezer for two or three days just to make sure the deed is done.

Once all remnants of moths have been turned into popsicles, the frames should be allowed to completely thaw before storing them away in a bug-proof container. If not thawed first, condensation will form on the frames and they'll get moldy while in storage.

A dedicated freezer is somewhere between an extremely useful luxury and a necessity for a hobby beekeeper. Fortunately, a basic, 7 cubic foot chest model (large enough for a couple of hives' worth of deep frames) can be purchased on sale for less than \$200 at a Big Box Store. If a lot of frames need to be processed, they can be frozen in batches.

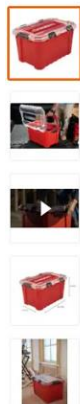
### Long-term storage of brood comb

PDB-treated frames are stored in stacked boxes according to the product instructions. B402 Certan-treated frames can be stored in any convenient manner without fear of reinfestation. But frozen frames must be stored in such a way that wax moths cannot gain access to the comb and reinfest it. If you've ever closely examined a wax moth, they are very flat creatures, much like a Stealth Bomber. They can maneuver through small cracks, such as a gap between an inner and outer cover. A cheap Wal-Mart storage bin with a handy snap-

<sup>1</sup> [USDA](#) recommends setting household freezers to 0°F for best food quality.

### 20-Gal. Professional Duty Waterproof Storage Container with Hinged Lid in Red

★★★★★ (2109) Questions & Answers (159)



A waterproof storage bin should also be moth-proof. We hope.

on lid is not sufficient to keep a determined moth out of all of that luscious, beckoning wax.

A popular beginner's option is to store frames in large plastic bags. I used to do that when I was young and inexperienced. I have since discovered that wax moths can eat plastic.<sup>2</sup> A carefully sealed bag full of highly-valuable comb can be opened months later and found to be transformed into a bag of worthless grey webbing, with tell-tale holes in the bag to suggest what happened.

A far better storage option is to use bins that have gaskets and locking lids. They are a bit more expensive than the cheap options but should be far more protective.

For only a few frames, another option is to simply leave the frames in the freezer if the space isn't needed for anything else. Make sure they are fully thawed before returning them to a hive with bees.

### Long-term storage of surplus honey comb

As mentioned, comb that has never been used for brood rearing is simple to store. A popular method is to hang the frames on racks so that they are exposed to light and air. Do not leave them in stacked boxes. The topmost



Pure wax honey comb can be easily stored when it is exposed to air and light.

frames, the ones exposed to light and air, will be fine but the ones deep in the darkest areas of the stack can be molested by the moths.

If by bad luck some honey comb frames have been used to raise brood, they can be stored using the same methods I've described for brood frames.

### Waste not, want not

The ability to reuse comb is the very reason that the honey extractor was invented 160 years ago. It is wasteful to allow perfectly good comb to be ravaged by wax moths; it also takes honey money out of our pocket when the bees must replace that comb. Let's all exercise vigilance to reduce infestation in the first place (see "[Pity the Poor Wax Moth?](#)" for more on that topic) and then follow good practices to preserve our expensive hive assets.

*Randall Austin is a NC Master Beekeeper who keeps a few honey bee hives in northern Orange County, NC. He can be reached at [s.randall.austin@gmail.com](mailto:s.randall.austin@gmail.com).*

*Note: All previous articles are archived at [https://baileybeesupply.com/educational\\_resources/](https://baileybeesupply.com/educational_resources/) Copyright 2024, no reproduction in whole or in part without permission of the author, except for noncommercial, educational purposes.*

<sup>2</sup> See, for example, Harald Grove, et al., "How Waxworms Eat Plastic", Brandon University website, March 2021, [https://www.brandonu.ca/research-](https://www.brandonu.ca/research-connection/article/how-waxworms-eat-plastic/#:~:text=What%20you%20need%20to%20know,commonly%20used%20in%20shopping%20bags.)

[connection/article/how-waxworms-eat-plastic/#:~:text=What%20you%20need%20to%20know,commonly%20used%20in%20shopping%20bags.](https://www.brandonu.ca/research-connection/article/how-waxworms-eat-plastic/#:~:text=What%20you%20need%20to%20know,commonly%20used%20in%20shopping%20bags.)