

“Sooner or later, everything old is new again.”

— *Stephen King (2005)*

“Everything Old Is New Again”

— *Peter Allen and Carole Bayer Sager (1974)*

“What has been will be again,
what has been done will be done again;
there is nothing new under the sun.”

— *Solomon, Ecclesiastes 1:9 (NIV) (c 950 BC)*

2020 has been cram packed with lots of news and events to entertain us as we have been in pandemic lock-down. Rioting, earthquakes, massive out-of-control fires and a record number of hurricanes are just a few of the things that we hope we won't ever see again. But there are good things that have happened this year too, such as the wildly-popular “Joe Exotic” documentary series on NetFlix and EPA's approval of B402 Certan for control of wax moth larvae on stored comb.

Unloved step-child?

The truth is, the “new” wax moth control is both new and old. We had a nearly identical product many years ago but its US EPA registration expired and wasn't renewed. B401 Certan belonged to Sandoz Crop Protection; in the pharma/chem industry merger and acquisition heyday of the mid 1990s into the 2000s, that company got passed around and/or merged with Ciba, Novartis and Syngenta, to name a few. The US beekeeper market is so small that Certan fell through the cracks. So for around twenty years, we have not had a legally-labeled version of the product to control wax moths on stored comb.

Vita Bee Health, the same people who give us Apiguard, Apistan and a wide variety of other bee-health products, acquired B401 Certan and have been selling it in Europe for years. They teamed with Valent Biosciences to develop an improved version; it is that version, B402, that was recently approved by EPA and is now available in US bee supply stores. The new



The comb in these frames (photographed from below) has been almost completely consumed by wax moths. What remains is tightly bound together with webbing and frass.

version is replacing the B401 version in Europe as well.

What is it?

B402 Certan contains *Bacillus thuringiensis* subspecies *aizawai* strain ABTS-1857. You've probably heard of *Bacillus thuringiensis* (Bt), a bacterium that is often used to control insect pests. In fact, one of the few insecticidal products that I use around my place is Mosquito Dunks, *Bacillus thuringiensis* subspecies *israelensis*, strain BMP-144. (I'm not opposed to using pesticides in general, but I'm a lazy tightwad. Mosquito Dunks are effective; available free of charge from my county's Environmental Services Department; completely safe for me, my pets and my bees and are extremely easy to use.)

Bacillus thuringiensis products work in a very interesting way, as explained by Exttoxnet, the Extension Toxicology Network:

Bacillus thuringiensis (B.t.) is a naturally-occurring soil bacterium that produces poisons which cause disease in insects.... B.t. forms asexual reproductive cells, called spores, which enable it to survive in adverse conditions. During the process of spore formation, B.t. also produces unique crystalline bodies as a companion product. The spores and crystals of B.t. must be eaten before they can act as poisons in the target insects. B.t. is therefore referred to as a stomach poison. B.t. crystals dissolve in response to intestinal conditions of susceptible insect larvae. This paralyzes the cells in the gut, interfering with normal digestion and triggering the insect to stop feeding on host plants. B.t. spores can then invade other insect tissue, multiplying in the insect's blood, until the insect dies. Death can occur within a few hours to a few weeks of B.t. application, depending on the insect species and the amount of B.t. ingested.¹

The Bt product typically contains the strain-specific crystalized proteins mentioned above as well as the Bt bacteria. Their mode of action sounds scary, and it should be scary for the target insects because it can be 100% effective when applied correctly. But humans have nothing to fear because "Bt is only activated in the alkaline environment of the insect gut, compared to the acidic environment of human stomachs. In human stomachs, it is easily digested. As such, no adverse effects are expected after long-term dietary exposure to Bt, whether its proteins are sprayed on plants or grown within plant tissues."²

With respect to honey bees, Dr. Max Watkins, CEO of Vita Bee Health, said, "Together with Valent Biosciences, we faced the challenge of finding a strain that selectively targets wax moths. We sought to improve on B401, an earlier bee-safe product. Our



B402 Certain is an effective wax-moth larvicide that does not harm other animals, including our honey bees. It is now for sale at your favorite bee supply store.

synergistic relationship with Valent Biosciences, combined with the company's quality control and product consistency, enabled us to work together successfully to locate a strain and formulation of Bt that demonstrates specific control of both greater and lesser wax moths (*Galleria mellonella* and *Achroia grisella*), while being harmless to bees under this use."³

How do we use it?

B402 Certain comes in a concentrated solution. The mixing and application instructions, found in the [EPA label](#), are extremely simple. Mix one part B402 concentrate with 19 parts water to get a 5% solution. Agitate the spray bottle while applying to keep the material in suspension. Then, according to the label:

- Apply B402 in the autumn to beehive frames prior to placing combs in storage. Allow treated frames to completely dry prior to storage.
- Spray one fluid ounce of the 5% spray solution on each deep frame; 2/3 ounce of 5% spray solution on each medium frame, ½

¹ "Bacillus Thuringiensis", Extoxnet, <http://pmep.cce.cornell.edu/profiles/extoxnet/24d-captan/bt-ext.html>

² Perez, J.; Bond, C.; Buhl, K.; Stone, D. 2015. "Bacillus thuringiensis (Bt) General Fact Sheet", National Pesticide Information Center, Oregon State University Extension Services, <http://npic.orst.edu/factsheets/btgen.html>

³ yahoo!finance, "Valent BioSciences Partners with Vita Bee Health to Develop New Biological Wax Moth Control That Safeguards Health of Honeybees", June 16, 2020, <https://finance.yahoo.com/news/valent-biosciences-partners-vita-bee-150000493.html>

ounce of 5% spray solution on each shallow frame.

- Apply spray solution uniformly to both sides of the frame, the foundation and wax combs.”

Useful tip: Before you begin, calibrate your sprayer using plain water to see how much you’ll need to spray to achieve the necessary coverage and volume.

That’s it. After applying the solution, frames should be protected for a very long time, at least a year, as long as the frames are stored in the dark (sunlight breaks down Bt in a matter of days).

It is extremely important to note that B402 Certan is not to be used on frames within a hive that has bees. If nothing else, the in-hive temperature generated by a colony of bees (about 95°F in the brood nest) renders the spores inviable,⁴ so it would be a total waste of your money.

A five-ounce bottle of B402 retails for about \$40 and will treat 100 frames. The label says the mixed product should be used within three days so only mix up as much as you need at time. Not good at math? The label includes a handy chart to show how much product you need to dilute to treat the number of frames you want to store. The chart is copied below.

	# 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	5¼ fl oz	¼ fl oz	5.5 fl oz
	100	1 2/3 Qt	2¼ fl oz	1¼ Qt
	1000	3.6 Gal	0.9 Qt	4.5 Gal

Read the label!

As with all pesticides, “the label is the law.” It is illegal to apply any pesticide contrary to the EPA-approved label directions. So do not use this article as a reference when you go to mix up a B402 Certan solution to treat your stored frames! Get the real instructions from the product label and follow them. If the printed label is missing or unreadable, you can access the label for any pesticide that is approved for use in North Carolina here:

<http://www.kellysolutions.com/nc/>.

The wax moth, perhaps our favorite long-time enemy, is a non-native invasive species that has plagued beekeepers since at least the early 1800s. Maybe this product will give us an upper hand. But if you feel a bit sentimental in the face of their potential eradication, read September 2015’s “[Pity the Poor Wax Moth?](#)” We’ll always have memories!

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Note: All previous articles are archived at https://baileybeesupply.com/educational_resources/

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⁴ US Environmental Protection Agency, “First Beehive Uses of the Currently Registered Active Ingredient Bacillus thuringiensis, subsp. aizawai strain ABTS 1857”, January 10, 2020,

<https://www.epa.gov/pesticides/first-beehive-uses-currently-registered-active-ingredient-bacillus-thuringiensis-subsp>