

Powered Sugar

Powered sugar has been used with great success in maintaining hive health when dusting bees in the hive.

Does this lead us to believe that powder sugaring our packages prior to installing in the hive would be a good practice?

Depends upon whether the packages have mites or not. According to Dr Marion Ellis' research, a good sugar dusting of caged bees over a solid bottom will drop about 75% of the mites.

“We applied measured amounts of powdered sugar directly to honey bee brood combs containing eggs and larvae of known age groups. 24 h later, we compared powdered sugar-treated brood with similarly aged cohorts of immature bees that did not receive powdered sugar. Low and high doses of powdered sugar (0.3 and 0.6 g per 151.5 ± 1.0 cells, respectively) caused significant egg removal of 62.2 ± 5.1% and 86.1 ± 5.1%, respectively, when compared to eggs that received no powdered sugar ($t = 16.91$; $df = 29$; $P = 0.0001$). Powdered sugar had no effect on 5-day-old honey bee larvae ($t = 0.74$; $df = 29$; $P = 0.4668$), but caused a significant percentage of 8-day-old larvae (18.5 ± 4.5%) to be removed when applied at the high dose ($t = 4.10$; $df = 29$; $P = 0.0003$)”.

Cheapest place I know of to buy Powered Sugar is the Rural Discount Center in Chugiak. I buy it and use it. You can use a common flour sifter and apply heavy over the top bars and brush the excess off the top bars prior to closing the hive. Screened bottom board or sticky board or slatted bottom board can be used as well. If you do not use some type of open bottom board it is possible for the mites to become “hitch hikers” on the incoming bees. I like to use it to hive my bees and treat in the fall with three intervals 4 to 5 days apart.

1) What The Heck IS "Sugar-Dusting", Anyway?

It is a technique that Dr. Fakhimzadeh proposed as a part of his Doctoral work. He published it in all the journals. I tried it. It works for

me. Your mileage may vary I can state that I have done my best to "reproduce" his results, and I feel that I can confirm and endorse his findings.

The idea is simple. When varroa fall down below a varroa screen, they don't crawl back up into the hive. Varroa have little "suction-cup" feet. Sugar particles that are around 5 microns in diameter clog up their little suction cups, and they can't hang onto things. They fall. They die. They don't live to reproduce. Therefore, dusting the backs of the bees will knock off some significant percentage of the mites, keeping the population "under the economic threshold". (Beg, borrow, or Xerox the ABJ article. Read the details for yourself.)

Given time, we may find that sugar dusting allows one to stop using (or at least skip a year of using) Apistan strips and other toxic stuff.

I have nothing against the makers of chemicals, but one wants to have more than one weapon when one deals with a beast like Varroa, and this is both a cheap and effective non-toxic treatment.

2) Which Powered Sugar To Use?

I do not think that 2% - 5% corn starch (found in Domino 10X and most other store brands) matters one bit. My reasoning is that one does not sugar-dust a hive until the warmer days, and there should be none of the problems that one might have with impurities in winter feed (dysentery). If the bees can fly, they can certainly avoid dysentery.

But, just in case, try to find the LOWEST percentage of corn starch you can.

There are rumors of "pure" powered sugar with zero corn starch (added to keep it from clumping up). I have yet to find any.

3) How To Prep The Sugar?

If you read the articles, you find that VERY tiny sugar particles are what clog up the "suction cups" on the legs of the varroa mites. But how to insure that you "dust" a minimal amount of useless larger particles, when the optimal particle size is on the order of 5 microns?

This is what I do. It is far from "perfect", but it works, and requires no special equipment or skills:

3a) First, all sugar is sifted with a good-quality baking flour sifter. This removes the big lumps. One can simply dump the lumpy stuff back into the supply of sugar to be used in baking.

3b) Sift the sugar AGAIN, this time letting the sugar fall into a container that you can seal tightly against moisture.

3c) Do your sifting on a dry day. How dry? The driest possible. Mid-winter is a good time to do this, as heating systems tend to dry out the inside air. A day when you can get a shock from a doorknob is likely about the driest you can have. This week it happened to me about ten times!

3d) Add some rice to your sugar container to absorb humidity, and keep the sugar dry (Grandpa did it with his salt shaker...)

3e) SEAL the container tightly (I use canning jars).

3f) Note that you are likely sifting sugar in a kitchen. Both the sifter and the kitchen may be "community property" under the law, but a wise beekeeper would do the sifting over the sink, and be sure to clean up after the sifting.

4) How To Apply The Sugar To The Colony?

Since application of the sugar is the only "technique" one must master, I have messed with several different "varroa pistols". Randy Oliver is said to have developed an 8 second per hive method.

The lowest-cost (and perhaps overall best) approach would be to use a well-washed and dried baby-powder container, one with a cap that twists to reveal tiny holes. You open the twist-cap so that the holes are partly open, squeeze the plastic bottle sharply, and the result (with a little practice) should be a satisfying cloud of fine sugar particles.

With a little practice, you can perfect your "range" accuracy, and dust the bees without getting too much on the comb or frames.

If the tiny holes get plugged up, give the bottle a sharp thump to dislodge the clogs.

Now, you can remove frames, one at a time, give each side a few "poofs" of sugar, and replace them in the super or hive body.

One hand holds the frame, and the other holds the baby-power container.

Need two hands to pull that frame? Wear a carpenter's tool belt, and you have a "holster" for your varroa pistol and your hive tool.

There are some who have mentioned simply dusting the top bars rather than removing the frames, but the idea here is to do one's best to knock down all the adult varroa in the hive, so I have dusted every side of every frame (except those with open cells, on the grounds that the queen looks for "clean" cells [watch a queen sometime, she "inspects" every single cell before laying], and those cells that contain unsealed brood.)

Dr. Fakhimzadeh says that one need not be so careful, and that sugar DOES NOT have a negative effect on open brood or eggs.

Regardless, I'd still try to avoid open cells ready for laying, since one does not want to slow down one's queen.

5) I'm A Klutz - I'll Drop A Frame, Or Crush Bees!

Don't sweat it. Several of the bee suppliers sell a handy item called a "frame hanger". It has two brackets that slide over the edge of a hive, and two arms that support several frames at a time, hanging them out where you can dust them. You can buy one, and use two hands to handle the frames at all times. This helps in keeping the grass, dirt or leaves off the frames.

If you are a klutz, this will be a good way to get in the habit of developing skill, style, and panache in tearing down a hive, looking at comb, finding the queen, and other skills basic to "working with bees".

Keep at it. You'll get better.

6) OK, I've Dusted My Hives - Now What?

I going to assume that you have a varroa screen, a slatted bottom board, or at least a sticky-board insert with a mesh cover. (If you don't, get one! Sugar dusting will not help if the mites can crawl onto another bee after their fall. Better yet, even when you are NOT sugar-dusting, quite a few mites will fall through a varroa screen.)

I use plain old "shelf paper", cut to the correct size, with the backing paper removed at the hive, and the shelf paper slid into the rear opening below the varroa screen **STICKY SIDE UP**. I'll say it again - **STICKY SIDE UP!!!**

If you slide a fresh sheet in just before you do your dusting, you can get the most accurate "body count". There are many methods to count, I don't care how you count

("pick a few square inches", count all the varroa in a stripe across the sticky paper, whatever). But pick a method and **STICK** with it, so your data is all based on the same "sampling technique". You can also just grease or Vasoline a thin insert to catch the mites; whatever works best for you.

When you sugar-dust, you should get more varroa on your sticky paper than you have **EVER** seen before. More than you would see after 48 hours with varroa strips, more than with any chemical.

Remove that paper after a day or two, and replace it with a fresh sheet to count "falling survivors". You should see few on the second sheet, even after a week or two.

Why sticky paper at all? Well, if you are doing sugar rolls as a varroa detection method, you may choose to **NOT** use sticky paper, but I **LIKE** seeing the actual results of the sugar dusting.

Seriously, once a varroa falls down below the varroa screen, it will **NOT** crawl back up into the hive and onto a bee. They just are not that smart. The varroa will simply lie there and starve to death, waiting for a bee to come close enough to climb upon. Several articles in the Bee journals have addressed the effectiveness of varroa screens.

7) **WHEN** Do I Dust My Hives?

When you see "high enough" varroa counts as a result of a sugar roll or on a sticky paper placed under your varroa screen.

But what's "high enough"? Well, you have to keep track, keep records, and develop a judgement about such things. I can't simply give you a number, since there is no single number that would work for all hives, and no two beekeepers are going to even "sugar shake" their bees the same way.

There is a trade-off here. One could sugar-dust a hive every week, but think of the impact on the productivity of the bees. Doing a complete tear-down of a hive is VERY disruptive. Better to tolerate a low varroa population for a while than to disrupt the hive so often.

One is likely never going to see zero varroa during the summer, so if you see zero varroa, question your test methodology.

8) I Have An Insecticide Duster - Can I Use It To Dust My Bees?

You can use the same type of device, but I would buy a new one and mark it "Sugar Only", for obvious reasons