

## Working with Screened Bottom Boards By Landi Simone

When Kira and I attended EAS this past August, we had the opportunity to listen to many of the bee gurus speak and two themes dominated this year's conference. One was that we beekeepers really need to change the way we manage our colonies or we are going to be facing some serious residue problems: pesticide residues in our honey and in our beeswax. The second theme stands on its own and is intimately related to the first. It is IPM, IPM, and more IPM.

As one who has dabbled with organic agriculture for thirty years, I took to IPM with my bees like a duck takes to water. Because of my great reluctance to put any kind of chemical in my hives, the dictum <sup>3</sup>Look before you Treat<sup>2</sup> made marvelous sense to me, and I spent my early years in beekeeping divining the nitty-gritty of an IPM program that works for my bees and me. Screened bottom boards are one of the most important components of my IPM program, so I thought I'd share exactly how I use this important piece of equipment.

The screened bottom board (SBB) is a multifunctional IPM tool. A correctly designed SBB will actually help reduce a colony's total varroa mite load, as some mites lose their grip and fall off. Those that fall to the bottom without grabbing onto another bee will go through the screen, never to be seen again, and Good Riddance! If the screen is not completely open but sits above a solid bottom, the mites may be able to crawl back up and find another host bee if the distance between the screen and the solid bottom is too small. I have been using SBB's of this type and like to see a minimum of 1 1/2" between the screen and the solid bottom. This distance pretty much guarantees that any mite that makes it to the bottom, stays there. I have read several articles on studies of how many mites meet their doom by falling through the screen and the estimates seem to run from 5 to 40%. My own gut feeling is that for most colonies, the numbers are nearer the low end of this range rather than the high. Certainly the SBB is part of a total IPM program which includes good queen genetics, cultural tools to reduce robbing and drifting, miticides when needed, etc., etc. Anyone seeking to rely solely on SBB's to control varroa will soon be weeping over empty hives.

The second thrust of the SBB and, in my own opinion, the more important one, is as a mite-monitoring tool. By placing a sticky board below the screen, I can trap falling mites and count them in order to approximate a colony's total mite load. This information helps me reach my critical IPM decision: to Treat or not to Treat. How well I recall my mystification (on many levels!) during my early years in beekeeping. Did my bees have varroa mites or not? How many? Should I put Apistan in? They looked all right and I didn't see any mites, but I couldn't very well examine each and every bee. How could I be sure? I now know that all my colonies have varroa all the time, and I'm okay with that. Sticky boards tell me how bad their varroa problem is so I can decide if I need to do something about it. I am no longer in the dark. I know. And believe me, knowledge is power. In this case, the power to keep my bees alive.

The other type of SBB is one that has no bottom; the screen is open to the air. Hive stands for this type must rest below the side runners of the bottom board so that the screened portion is not resting on a solid surface and can do its job. In open SBB's, the mites fall right to the ground. I have never used this type of SBB but purchased half a dozen of them at EAS and plan to give them a try. I have spoken to several beekeepers, including some of the commercial guys, who absolutely swear by them, claiming bees kept over open screens winter better, produce more brood, more honey, and have less disease. My own reservations about these open screens have centered on visions of wind whipping through my poor clusters, freezing them solid. When I voiced these concerns, many of the bee gurus (including Medhat) assured me that it's not excess ventilation that kills bees, it's excess moisture. Then someone piped up, I'll bet you don't see Tony Jadcak putting his bees on open screens. Tony, as many of you probably know, is the Maine State Apiarist, and commands enormous respect in the beekeeping community. Being at EAS, I had the opportunity and so I asked Tony what he thought of open screens. Tony's thoughts were that the bees survived just fine but that the queens, in the cold Maine springs, tended to lay in the upper hive bodies, well away from the screen, leaving the lower box or boxes empty. There's a pretty big difference between Maine and New Jersey. I'll let you know how my girls do on open screens next year.

Any open SBB you purchase should still have a way of placing a sticky board below the screen, and it must be far enough below the screen that the mites can't climb back up. Several years ago I tried one type that had metal straps across the bottom, and the sticky board was supposed to slide above these straps. Problem was, it was almost impossible to get the board in there without actually removing the hive from its stand. Brushy Mountain has a new design (which I purchased) that has criss-crossed elastic strings across the bottom to hold the sticky board. Steve and Sandy Forrest assured me that this design is much easier to work with. I'll let you know.

Speaking of SBB design, there are some SBB's out there that have screens large enough for a bee to get through. To my mind, this is simply ludicrous. If the SBB is open, a bee-accessible screen is an invitation to robbing. If it has a solid bottom, the bees will be able to get to any sticky board you place below the screen where they will either a) get stuck themselves, or b) pick up a few fallen mites, or c) both. Just a bad idea. Period.

Another design flaw that I find very annoying is SBB's that have an opening in back or front to slide your sticky boards in that are large enough to admit a honeybee. I have found that, if the bees are able to get to that sticky board that is exactly what they will do. A certain amount of pollen always falls through the screen and I imagine our industrious girls can't bear to waste it, so they go on down to get it and return, if at all, with some mitey undesirable hitchhikers.

I have made about a dozen SBB's of my own design that include an opening in the back to slip the sticky board in. The opening is covered by a piece of trim on hinges that can flip up and down. Flip it up, slide the board in, flip it down to exclude the bees. Even with this design, bees sometimes manage to make it to that sticky board, so I'm going to

try to put strips of foam insulation on some of my leaky hinged doors to fill in those little cracks the bees always manage to find.

This brings us to the subject of the sticky boards themselves. What exactly does one put down there? There are several different kinds. Most of the commercial SBB's come with a white plastic sticky board that you can use. These work fine with a layer of petroleum jelly. There are others that come with a grid already printed on them that look like a laminated piece of white paper. These are overly flexible, though the grid is nice. A couple of years ago, Bob Hughes gave me a case of real, live commercial sticky boards with a peel-off backing. They're like a thick paper and there is absolutely nothing so sticky as one of these commercial jobs. They stick to everything. Your fingers. Your clothes. Your hive tool. God forbid there should be access for the bees to these things because if there is, you'll come back and find hundreds of dead or still-struggling bees stuck fast to your sticky board. Ugh! And of course, once you've actually touched the business side of the sticky board, the glue is on your fingers, so anything else you touch after that is permanently attached. Can you tell these are not my favorite sticky boards?

Yet another type of sticky board has an embossed pattern on it of light and dark squares, with the idea being that you only count the mites that land on the light squares, saving yourself time and energy by not having to count every mite. I don't like these. They are based on random number theory and I don't feel they are appropriate to this application because the pattern of mite fall on a sticky board is definitely not random. In my 20-year career as a consulting engineer, I designed many sampling programs using random numbers. I honestly don't think they are right for this application and therefore take the extra time to count all my mites.

The ones I like the very best are actually homemade. They're very economical and work better than any other type I've tried. I purchased a 4" x 8" piece of 1/8" flat tile board at Home Depot. This is a material that is a brown particleboard with one side laminated with a thin white plastic. The large sheet can be readily cut with a saber saw into about sixteen 14" x 18" sticky boards. Because the thin plastic on the one side tends to chip when cut, I take white electrical tape and cover the edges with it for a neater look. Then I use a ruler and permanent laundry marker to inscribe a grid on the white side. A 3 x 4 grid seems to work well and really facilitates mite counting. These sticky boards are very nice because they are rigid, making them easy to handle, durable, easy to clean, and lightweight. I like to make little electrical tape looped handles<sup>2</sup>, which facilitate pulling the sticky boards out from under the screens, and label each with the hive number. Each of my colonies has a dedicated sticky board, which I believe helps reduce the risk of spreading disease.

Now comes the fun part: making the tile board into a real sticky board. I purchase a large tub of generic petroleum jelly at the drug store and, using an old paintbrush, paint the white plastic side of my sticky board with a thin layer of petroleum jelly. The old paintbrush goes into a zip lock bag, where it lives until it's time to paint the next set of sticky boards. DO NOT use Pam, oil, or any spray adhesive. The research shows that these substances simply do not trap mites the way petroleum jelly or a commercial sticky

board do. So if you use them, you are under-counting mites - a good way to lose colonies. Spray adhesives also have volatile vapors that can hurt or kill your bees.

Armed with my carload of sticky boards, stacked jelly side to jelly side, I arrive at one of my apiaries, and slip the boards in place under the screens. I usually use one of those nifty long-handled bottom board cleaners to make sure there isn't too much debris on the solid part of the bottom board where the sticky board will sit before I put it in. And I am very careful to insure that bees can't get at the boards. I jot down the time in my notebook and leave for the next bee yard.

When I am doing mite counts, I try to disturb the bees as little as possible, not opening the hives at all if I can help it. The number I'm looking for is how many adult female mites fall on that sticky board naturally (without any chemical treatment or other disturbance) over a 24-hour period. There is variation in the mite fall from day to day. A few years ago, Alex Berlin showed me some data he had collected from his colonies, counting mites daily for weeks. The variation was definitely significant, and for this reason, Dr. Dewey Caron recommends leaving the boards in place for three days and dividing the final count by three for your 24-hour count. This helps improve the accuracy of a monitoring method that is by its very nature a ballpark approximation. I am sometimes a little lazy and collect the boards anytime after 48 hours, especially if I think there may be lots of mites. Counting can get tedious!

Arriving at your 24-hour count involves a little simple math. Say you put a board down at 10:00 am Friday morning and remove it at 10:00 am Monday. If your total count is 99 mites, then your 24-hour count is  $99/3 = 33$  mites. But what if you drop the board off at 10:00 am Friday and pick it up at 5:00 pm Sunday? The total number of hours the board actually sat under the colony is 55. If you counted 99 mites, your 24-hour count is  $99/55 \times 24 = 43$ . In other words, take the total mite count, divide it by the number of hours the board was under the colony and multiply by 24. This gives your equivalent 24-hour natural mite fall. Obviously it's also important to make a note of the time you collect the boards as well as when you set them out.

Getting the boards back home to count can be a challenge. I spread them out, mite side up, on every available stable horizontal surface in my mini-van, and some not-so-stable surfaces, too, when I run out of the good spots. If a kid or two is with me, they sometimes travel with a sticky board on the lap, and stern admonishments of don't touch that! And Hold perfectly still! Or No, you CANNOT spit your gum out on the sticky board! Eventually I make it home, unload somewhere safe (usually the greenhouse), and my resting pulse returns to normal.

Now it's time to count mites. You will be amazed at how much stuff falls onto that sticky board. Pollen, wax cappings, especially during dearth, wax moth droppings and sometimes moth larvae, little spiders or flies, and, of course, varroa - all make it to the board. To get my count, I work with a pair of reading glasses and a magnifying glass and look at one grid section at a time. I use a container of adzuki beans, which are very small, and drop a bean on top of every mite I count. This helps me to not count the same

mite twice. Plus if halfway through I hear, <sup>3</sup>MOM! Hairy Purrer<sup>1</sup>s caught a bird! And I lose count while I go on a rescue mission, I can always count the beans.

Another important thing to know is which mites to count. Smaller, round and pale mites are males. Tan or lighter brown oval mites are immature females. Don't count any of these. The only mites you want to count are the very dark reddish brown (sometimes almost black) oval mites. These are the reproductively mature female mites. There may be lots of immature females on your board, especially if you have hygienic bees. Your efficient bees are ripping the pupal cappings off of parasitized brood and disposing of the immature mites. Good girls! Both Dr. Medhat Nasr and Dr. Marla Spivak have assured me that we count only the very darkest mites.

The boards are very easy to clean, and I do so as soon as I finish counting mites on a board and have recorded the number. Using a wide putty knife of the kind used for applying spackle, I scrape off the petroleum jelly plus debris and wipe the knife off on the grass or a rag. A quick wipe with a paper towel and my boards are ready to store for next time. They'll still have a very thin film of petroleum jelly but that doesn't hurt anything.

Now you have a number. What do you do with it? If I have counted mites in late July or August, I will use a miticide on any colony that has 50 or more mites fall in a 24-hour period. I do not treat colonies with less than this number.

I also check my bees for varroa in spring. I have found that if there are more than 2 mites in a 24-hour count in early March, I should treat. This cut-off number rises to 10 in mid-April but by mid-April, I'm only a couple of weeks away from the major honey flows so if I have a mite problem, I should already be treating and within a few weeks of removing the medication. Remember, under no circumstances should you have miticides and honey supers on your colonies at the same time.

Seeing string-wing or deformed bees in a hive in June? Throw a sticky board down. Wondering if your bees are still alive in late January? Put a sticky board in. If they're alive, you'll see wax cappings.

There are other methods of monitoring for varroa that are far more accurate than SBB's - laboratory techniques such as the alcohol wash. And once in a while, you'll make a wrong call based on data from an SBB. However, even though it's not the most accurate tool in beekeeping, for my money, the SBB is one of the most useful and provides a level of knowledge about conditions in the colony that sure beats, <sup>3</sup>I wonder if my bees have mites.....???