Sustainable Beekeeping

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You Can Keep Bees Without Chemicals

Erik Osterlund (photo by Bo Malmgren)



It's not an overstatement to say the beekeeping industry is in jeopardy around the world. Bees are dying. From every corner of the world alarm reports are reaching us... No, wait a minute! That's not entirely true. From most but not all places where our type of honey bee (Apis mellifera) are kept, is more correct. That gives us some hope that there are places to learn from, on how to save our beekeeping industry. The honey bee as a species is certainly not at danger, not at all. But we humans, we have a problem. And when we have a problem, almost always we have created it ourselves. So, what we need is a good analysis of the situation and how we arrived there. But that's already been done by many. The answer is not still out there. It's down here. We know Varroais stimulating virus to reproduce and attack our bees. We know pollen is essential for strong bees and good immune systems. We know plant protection chemicals kill and weaken insects, including bees. We know Apistan®, CheckMite®, Amitraz and other chemicals poison the wax and life environment of the bees. We know we pour acids on the poor bees. We know cell size is bigger today then when wax foundation was first introduced by A. I. Root in 1876. We know we have decreased the genetic variation in our bee stocks through too much inbreeding and too few queen mothers in commercial queen rearing. We know the bees can

5:4mm 4.9mm

Package shaken onto starter strips only, with enough height in the hive build smaller cell sizes where brood is, closer to entrance and bottom, and bigger where honey is. (Photo by Dennis Murrell.)

stand a lot we do to them, but now we know it's become too much. When will we ever learn? When man didn't interfere with the bees they survived and managed well enough. And they managed man's interference quite well for many years. Now we have to give the bees back more of their natural way of life, and reduce the stress factors we've given them:

- 1. Go back to five cells to the inch, at least, on wax foundation.
- 2. Really try to give your bees a good pollen and nectar supply.
- 3. Avoid all kinds of poisonous chemicals.
- 4. Be sure to avoid inbreeding, but focus on survivors.

1. GO BACK IN CELL SIZE

Why so much fuss about this? It's so easy. Read the old bee books. Follow what's happened. It's clear. Already in 1888 Frank Cheshire in England wrote he was the only one arguing against enlarging the honey bee. No scientific backup for this enlargement has been shown. Roy Grout in his PhD thesis in the 30s showed there was no gain with doing so. Can we lose anything giving the bees back what they wanted when foundation started in 1876? Even today given the right help the bees will build on their own what they did back then. Look here: http://www.bwrangler.com/bee/ncom.htm

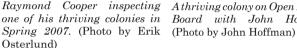
Don't come up with the argument there is no scientific study showing it's the solution against Varroa. It's not *the* solution. There's more to it. Show me instead why we shouldn't go back. You say it's too expensive. No, it's too expensive not to. Look at all the dead colonies and look at those that have gone back in size, besides the Lusby's, there's http://www.bushfarms.com/beesnaturalcell.htm; http://www.lapalmamiel.com/.

Here's some positive studies: http://www.scientificbeekeeping.com/index.php?option=com_content&task=view&id=51; http://www.honeysupercell.com/downloads/Commercial%20B kpg%20in%20Norway.pdf

But you say there are some negative studies, too. Yes, there are. Here's one: http://video.google.com/videoplay?docid=3081789258595842918

What's in common for the negative tests is that the control colonies and the test colonies are kept in the same apiary. Also, tests are run for only part of a season or for







Raymond Cooper inspecting Athriving colony on Open Bottom one of his thriving colonies in Board with John Hoffman.

only one season - very seldom two or more seasons. And sometimes survival is not studied at all but just the short time reproduction rate of the mite.

Why do we even need control colonies in small cell size tests? At least they shouldn't be in the same apiary. We've known for years that unselected bees on big cell comb if not treated will sooner or later die. And in 1990-92 it was shown by several that mite populations in hives in the same apiary even out in late season due to robbing and drifting between colonies (Arhus Aasne, Ingemar Fries, Henrik Hansen, Korpela Seppo, Journal of Apicultural Research 31(3/4): 157-164 (1992): Varroa Jacobsoni Oud. in cold climates: population growth, winter mortality and influence of the survival of honey bee colonies. "After treating five colonies of group one in the Autumn of 1990, the mite populations in treated colonies equalized during late Summer and Autumn 1991 probably because of drifting and robbing as suggested by Sakofski et al (1990), Büchler and Hoffmann (1991) and Greatti et al (1992)").

What we learn from this is that whatever we do with our bees it's best doing it in the whole area. At least in the whole apiary. Don't try a few colonies here and there among a large apiary and expect a clear cut result. Or a few VSH/ Primorski/Weaver/Kefuss or whatever selected bees among a big crowd of otherwise unselected bee colonies. When you begin the path in the spirit of the Brotherhood of Better Beekeepers, always convert at least one whole apiary at a time and as far away as possible from bad bees. But if you're a small beekeeper in the midst of many others? Do as good as you can and consider using open or screened bottom boards and powdered sugar as well.

Five cells to the inch is an average for all cell sizes in a colony. Brood cell sizes are smaller, and honey storage cell sizes are bigger. We know brood area cell size are even smaller than five cells to the inch (5.1 mm) which is why Dee Lusby and others have gone down to 4.9 mm cell size.

It's interesting that the African bee, known to build 4.7-5.0 mm cell size in their brood area, have never experienced heavy colony losses due to Varroa, and has developed a good tolerance of the mite. In South America and now also in South Africa, see http://upetd.up.ac.za/

thesis/available/etd-08082007-153050/unrestricted/ dissertation.pdf

Today it's easy to get your bees back to small cell size. You can purchase plastic fully drawn 4.9 cell size combs from Honey Super Cell: http://www.honeysupercell.com/ Or you can shift to plastic (Mannlake PF100 or PF120: http://www.mannlakeltd.com/catalog/page10.html) or wax foundation (Dadant: https://www.dadant.com/catalog/).

Raymond Cooper

Raymond Cooper's bees have been successful because his bees dominate his area around lola, Kansas. He's not using any drugs on his 1800 colonies, not even Terramycin. When he spots any American Foulbrood he takes it to a treatment apiary and treats it with Crisco and sugar. That's it. He's still giving his bees a spoonful of that Crisco/sugar mix in the Spring and in Autumn since the days of Tracheal mite problems. He's dominating the area with his setup of bees on 5.1 mm cell size. And his wax is not loaded with poison. He's making his own foundation. He's even making foundation making equipment.

But it's not difficult to spot Varroa mites in his hives and as the mites go for the drones in first place, he has problems getting good matings for his virgin queens. But winter losses are minimal - only 5-10%.

And he harvests good crops normally. Though too much rain stops all bees, even small cell bees. Nor is he using any particular strain selected for Varroaresistance. He's keen though on using queens that produce a lot of brood.

2. A GOOD FOOD SUPPLY

The proteins in our bodies are built from aminoacids in the food we eat. Pollen is the source for aminoacids for bees. Place your beevards where the bees have access to good pollen sources. Watch out for the weather so it doesn't hinder the bees from getting pollen, especially in Spring



Randy Oliver's 15- second method. Take away the inner cover, put on a screen frame with 1/8" mesh on the brood boxes. Pour one cup of powdered sugar for each broad box, without breaking apart the broad boxes. Brush the sugar evenly through the mesh. Take away the mesh and brush down from the top bars. Put on eventual excluder, super, inner and outer cover. Preferably you have a screened bottom board, or open, on the hive. (Photo by Randy Oliver)



Myron Kropf Winters his hives in single deep boxes four together insulated with a sheet of styrofoam or something similar. A good small cell size colony in November 2005 ready for Winter. Myron takes them down to a single box to avoid having the queens lay±ing in combs with other cell sizes than 4.9 mm. He gets 4.9 foun±dation well drawn in brood boxes only in the beginning of the season. So it takes some time to create a good supply of drawn brood combs. But he's constantly selecting for colonies drawing 4.9 longer into the season. (Photo by Erik Osterlund)



Pollen trap of Myron Kropf's design. The ventilation metal sheet has 3/16" holes for the bees to go through. For his small bees that's perfect. In the back there's four somewhat bigger holes for drones and queens. In front there's also a small extra entrance through which the workers pass and bring in pollen to the colo≠ny. When the flow is strong this little entrance is not enough, so the bees go through the trap. (Photo by Erik Osterlund)

after a tough period of no flow. The other important period is when bees are produced that will go into the next tough period without flow, often in August. Maybe pollen feeding is a good idea sometimes. Why not collect pollen when it's easy to collect and give it back at proper times? No pollen substitute is as good as real pollen.

Also there are many indications that you can't substitute honey for sugar either. The bees need a good part of their honey for survival until next season. We don't have HFCS (High Fructose Corn Syrup) in Sweden. Maybe we should be glad for that. If you decide you have to use sugar, sucrose is better.

3. POISONOUS STUFF

Chemicals that hinder normal body processes in the bees are of course stressing them and make it difficult to survive. These chemicals called miticides (including organic acids), are used for killing mites and thus helping the bees. But they also are more or less harmful to the bees. The important thing with these drugs is that the target bugs should be killed much easier than the host bug (the bee) should be harmed.

But the host doesn't go untouched. There is a negative impact on the bees too, more so with acids than correctly used phyretroids (Apistan). But acids don't end up in wax. Miticidesare not the only chemicals used. Antibiotics against AFB and Nosema are others.

Chemicals used to protect plant crops are others that end up in the bee colony too. Together all these chemicals make up a mix more dangerous than each one on its own. The wax collects many of them. The drugs are released slowly to the bees and present constant stress, disrupting their normal way of functioning. That's why plastic foundation may be a good alternative these days. Mann Lake sells one that can be used by small beekeepers - http://www.mannlakeltd.com/catalog/page10.html. It is 4.95 mm cell size. Cappings wax contains much less chemical residue than the comb it's taken from. But how do you get foundation made from your owncappings? Maybe you can mold or mill it yourself.

Open bottom boards (OBB) and Screened bottom boards (SBB) do not leave any residues with the bees, and they help in fighting Varroa. Again, you have to get all hives in the beeyard equipped with them, rather than only a small part to get best effect. That may well be why tests with them have given somewhat differing results.

You're the one to decide

Only a few may be able to just stop any kind of treatment. It is difficult. Here's some advice. Others have advice, too, the same, or different. We don't take responsibility (we can't) for our advice in your operation. You are the one who takes the consequences of your actions. So I encourage you to be sure to make your decisions after a thorough consideration of all the advice you've acquired. If you decide you have to use something in your hives to help your bees consider powdered sugar. It leaves no residues, is effective relatively quick if used as Randy Oliver does: http://www.scientificbeekeeping.com//index.php?option=com_content&tas=view&id=31&Itemid=40&limit=1&limit start=6 or the Brissons: http://www.countryrubes.com/instructionspage4.html.

4. BREED SURVIVORS WITH GENETIC VARIATION

There are many today breeding honey bees that are resistant or tolerant to Varroa. The first one giving a recipe for doing it was Eric H. Erickson at the Tucson Lab (Erickson, E.H., Hines, L.H., and Atmowidjojo, A.H., 2000. Producing *Varroa*-tolerant Honey Bees from Lo≠cally Adapted Stock: A Recipe, Am. Bee J. 140:659-66 1. The bees they used were partly on 5.1 mm cellsize.) John Kefuss in France (and Chile) was one of the first with the "Live and let die" concept. His K-Star strain hasn't tasted miticides for 15 years. You can reach him at ikefussbees@wanadoo.fr More than 10 years ago B. Weavers started their tolerance breeding. Today they haven't used any miticides on their own strains for many years. http://www.beeweaver.com/ home.php?cat=1 Kirk Webster in Vermont, Bob Brachmann in New York State, and Olympic Wilderness Apiaries (http: //www.owa.cc) are others that have come a long way in breedingtolerant bees. These three use Primorski (Russian) bees as a part in their breeding programs. All of these five still use large cell size.

Today, using, for example HoneySuperCell, taking your bees down to small cell size for survival is quicker than breeding for survival on large cell.

You eventually need the kind of local stock that is adapted to your environment for long term sustainable beekeeping. For obtaining what you need, first get your bees down to small cell size in an area where you will mate your virgins. The easiest way of selection together with keeping a good genetic variation is just making splits from your good colonies letting them raise their own queens and mate in this area dominant with your bees which do not taste drugs or chemicals. Only the strongest drones will mate with your virgins. In the colonies that don't do well or produce enough honey you shift the queens. Perhaps you will decide to use powdered sugar on some. To have queens for shifting you need to breed some from your good survivors and honey producers that are easy to handle.

Myron Kropf

This is the way Myron Kropf in Middletown, Missouri developed his beekeeping business. He didn't want to use any chemicals (including acids or essential oils) in his operation when he started as a beekeeper. But half of his bees died every Winter. Then he got to know about small cell size and began his journey in the Brotherhood of Better Beekeepers. He has ended up building his own 4.9 mill. He also bought some Primorski queens and combined with his local Italians.

He has gone from buying a lot of packages each year to selling packages, as well as producing pollen and honey from his now 200 colony operation. (And he's producing pollen traps too, which have smaller trapping holes than other traps for his smaller bees, 3/16" in ventilation metal sheets.) The Winter mortality is down to normal. Those apiaries in which he has experienced somewhat higher death rates are close to other beekeepers.

MY OWN BREEDING ADVENTURE

My breeding adventure started as soon as I became a beekeeper in 1976. In 1983 I visited Brother Adam and his Buckfast bees for the first time. And in 1989 I went with three others on a trip to the wilderness of western Kenya

An average
Swedish
beekeeper, Thore
Harnkloo, with
thriving Elgon
bees on small
cell size, free of
drugs. (Photo by
Erik Osterlund)



to the mountains. We wanted to bring home breeding material of *Apis mellifera monticola* to combine with our Swedish bees and hopefully breed more Varroa tolerant bees. You can read about this trip here: http://beesource.com/pov/osterlund/index.htm and more about my breeding efforts on http://elgon.se.

That was long before I got the mite in my own yards. At last they have arrived. Probably some years ago, but they were only detected last year. (No sign of bad Varroa effects have been seen except a few bees with crippled wings in one hive, which by the way have made it well through winter in strong shape.) Very few Winter losses in the Winter of 2007-08. In the meantime before my bees got the mite other beekeepers have helped as test hosts to the extent they themselves have decided. You can read about one of them, Poul-Erik Karlsen, on the beesource site. http://beesource.com/pov/osterlund/abjmar2001.htm. still keeps Elgon bees without drugs, on 5.1 mm cell size. Beekeeper B in that article is Leif Hjalmarsson in southern Sweden. He has an isolated apiary, on big cell size, now for 10 years without drugs. Well, he did a part of the colonies with Apistan® two years in a row. Two colonies were part of a test and this caused these colonies and the ones placed close to them to be treated.

Thore Harnkloo has his bees mainly in an isolated forest area. When he started with Elgon bees 10 years ago he had about 80 colonies. In 1999 mites were detected in his colonies. Now he has 60 colonies. He hasn't used any drug or treatment except for in Spring 2003 in about six colonies. They were the worst affected in two apiaries closer to apiaries of other beekeepers. His Elgon bees are on 4.9 and 5.1 mm cell size in the brood area.

DON'T GIVE UP

Your country needs you! Don't give up beekeeping! Discuss with your friends how to help yourself and others. Sometimes it helps to be somewhat politically incorrect. And share what works with us all, in bee clubs, on the internet and in magazines.

Erik Osterlund is the editor of the Swedish bee journal Bitidningen and runs 200 colonies.