

## Newbees, Bee-Ware

by Anne Frey, EAS Master Beekeeper

Though I have never used a top bar hive, I became intrigued with them a few years ago when my friend and fellow EAS Master Beekeeper Erin MacGregor-Forbes started running some in her bee yard. In addition to keeping track of Erin's TBH experiences, I have consulted with Wendy Booth, President of the New Hampshire Beekeepers Association; Tony Jadczyk, Maine State Apiarist; and Dan Kerwood, former President of the Southern Adirondack Beekeepers Association. With their help and the help of still others experienced with top bar hives, this article was born.

### NATURAL BEE INSTINCTS

*"Bees managed in top-bar hives are allowed to do what their natural instincts direct, not what we want them to do. Top-bar bees are healthier and happier."*

— from [topbarbees.com](http://topbarbees.com)

Before you sigh contentedly and embrace the platitude above, thinking it would be a fine world if we could just let the bees do their own thing and maybe all their troubles would then fade away, consider the following: Bees always do what their natural instincts direct. No beekeeper can tell honey bees what to do, and if you think you can, then you should continue keeping bees for a few more years and you'll learn otherwise. We beekeepers mold our actions to what we learn about and observe the bees doing, not the other way around. Bees draw comb from bars placed at the top of their colony, or within frames, or create free-hanging comb even lacking any woodenware. They make as much comb as they need, when they need it, providing they have room and plenty of carbohydrates (nectar or sugar syrup).

In recent years in the U.S. and Europe, there has been a trend toward trying top bar hives (TBHs). This long, horizontal type of hive uses no frames, just parallel bars of wood placed at the top of the hive. This is in contrast to the Langstroth hive, which is used by most beekeepers and is made of stacked boxes, each containing 8 to 10 rectangular frames for wax comb.

The TBHs sold or made now all began as copies of those originally used in less industrialized countries, mainly in Africa. In equatorial Africa, some people were lucky enough to have a bee tree, but others found one in the forest, cut it down, and brought the log home as a hive. Placing hollow logs near their home would sometimes also lure a swarm. These log hives were either kept on stands, or suspended in trees by ropes or wire, in a horizontal position, simply because it's easier and safer to handle a log horizontally than vertically. Later, enterprising beekeepers mimicked the log shape by building hives from lumber. The shape is a long horizontal box sometimes with tapered walls, as in the Kenyan TBH (the cross-section of the KTBH is a trapezoid).

### POINT BY POINT

**According to those who believe in TBHs, there are numerous reasons TBHs are better than Langstroth hives.** Advocates say the TBH is a more natural shape for a hive. The bees aren't forced into using a human-designed high-rise box. In TBH enthusiast lingo, "Why do people force these lovely creatures to conform to a design standardized by 'The Man?'" Normal wild comb shape is rounded at the bottom, not

rectangular; the angled walls of TBHs allow the bees to make that shape. Also, it is argued that allowing bees to build their own comb lets them retrogress to a smaller, more natural bee-body size by creating smaller cells than what they make when drawing cells from foundation.

Secondly, the TBH is supposed to be less expensive. No wax foundation is needed, and there are less hive parts in general — e.g. no bottom board, queen excluder, inner cover or outer cover. No honey extractor or uncapping knife are needed either, since harvesting is done by cutting the comb and using it as comb honey or crushing/straining it.



It is said that TBHs are better for small-scale beekeeping, since there is less disturbance when working hives, and less honey is created. Related to this, there is also no heavy lifting of supers.

TBH advocates say the comb is better since there is no re-use of honeycomb, thus reducing disease potential as well as chemical buildup in comb. They also say that bees in TBHs are less prone to diseases and parasites, partly because the cells are made smaller (to discourage the otherwise synchronized brood cycle of the varroa mite). Lastly, they say that honey from clean, new comb is of higher quality.



**That all sounds great, right? Well, yes, kind of.** That is, until I took a look at each statement through the lens of everything I know and have researched about honey bee behavior and how weather affects them. Allow me to address each one of the TBH claims in turn:

1 *The TBH better follows the shape of a natural hive.* Really, folks, the natural shape is a (standing) hollow tree. The Langstroth hive mimics a hollow tree better, since height is the largest dimension. The reason it looks like a box is simply that humans build with lumber.

2 *TBHs are less expensive.* This is true, but with caveats. A typical TBH kit costs \$495, or you can download plans to build your own, possibly from lumber you already have. This should not be hard, since the TBH can be made with about 20 board feet of lumber, and that makes me wonder why a kit costs \$495. A typical Langstroth hive with supers, plus a small extractor, etc. will run about \$650. Of course, both styles of beekeeping will need the usual bees, veil, gloves, hive tool, smoker, honey strainers, etc., and these are not included in these cost estimates. However, with the Langstroth hive, you get more hive. The volume of 2 deep brood chambers is 5,150 cubic

inches. The volume of 3 medium supers is 5,387 cu. in., which makes the total size for a summer Langstroth hive (2 deeps plus 3 mediums) 10,537 cu. in. Compare that to the volume of a 44-inch-long KTBH: 5,670 cubic inches. The TBH has only 54% of the volume of a supered Langstroth hive, and is only a bit over the volume of 2

deeps. The size of a TBH is smaller than a Langstroth hive being run for comb honey, and beekeepers who produce comb honey know this comparatively small size encourages swarming.

3 *TBHs are better for small-scale beekeeping.* "Small-scale beekeeping" has a nice ring to it, and seems to contrast itself favorably to the huge migratory operations that we've learned are stressing their bees by moving them into monocultural farms that overuse fungicides and pesticides, probably overusing hard chemical in-hive treatments, and suffering the most from CCD. In reality, almost all beekeepers are already small-scale beekeepers with

less than 5 hives, and consider the bees part of the family, like pets.

The argument that the bees are less disturbed when working a TBH is confusing. When drawing comb, at first the bees tend to stick it to the sloping sides of the hive, so a comb often must be sliced off in order to pull one up and examine it. The bees also often build comb in curves, across more than one top bar, which means the comb has to be cut off and the bar returned to the hive to be re-started. After all, hives must have removable combs in order to be inspected. With Langstroth hives, beginners may also disturb the hive, but at least during a normal inspection they aren't undoing the work that was done by the bees.

It is true that TBHs have no heavy supers to lift, and produce less honey. The 60-75 lbs. of honey harvested annually from a Langstroth hive may seem excessive to many when even a real honey-ophile consumes only about 20 lbs. per year.

TBHs may be appropriate for someone who only wants bees for pollination and the sheer joy of beekeeping, and can deal with re-stocking the hive each year. It is truly rare for a colony to make it through a northern winter, and if it does survive, the colony is often smaller than a baseball and must be saved by adding a package of bees to it in the spring.

4 *Disease and chemical buildup is lessened.* "Disease buildup" refers to American Foul Brood, Chalkbrood, European Foul Brood, and Sacbrood. Current advice for all beekeepers is to use brood comb only 4-5 years, combined with close inspection of every brood comb twice a year for all diseases to prevent any diseased comb from remaining in a hive. Varroa mite buildup may be lessened with smaller cell size, which may come about with bees drawing natural comb, though this is not confirmed by science yet.



Erin installing a swarm into the bees' new TBH home, Spring 2010. PHOTOS: SCOTT FORBES

Inside the Langstroth hive, the bees use whatever space they want to—sometimes a stretched ovoid shape up the middle. Also, creation of natural comb with varying cell sizes is possible with Langstroth hives, by using only a tiny strip of foundation—or none—on the top bar of each wooden frame. Excessive drone comb can be moved up into supers to use for honey production (free-formed comb includes a lot of drone-sized cells). As with any comb made without foundation, the hive must be perfectly level so combs are made at a right angle down from the top.

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Concerning chemical buildup, the claims made for TBHs are partly false. We're talking miticides here, used to combat Varroa mites. For TBH use, choice of miticide is limited to a strip form, so it's got to be Apistan or Checkmite, both "hard chemical" choices, or the new MiteAway Quick Strips (formic acid). Miticide strips are inserted between top bars and hang between combs. There is no way to use fuming miticides, which are the "soft chemicals" such as Apiguard or ApiLife Var (thymol), and MiteAway II (formic acid, discontinued) because there is no space above the top bars, and no space between them for the fumes to sink down between combs. Any chemical buildup from Apistan or Checkmite will occur in the brood nest area. Brood combs **are** reused and **will** have these chemicals build up even if strips are used properly. Comb removed for human consumption should never have been in contact with miticides. TBH owners are generally led to believe they never will need to, or shouldn't, use miticides, but they are a valuable choice in Integrated Pest Management if mites are building up. Varroa mites can transmit viruses to bees, further weakening a colony. Regarding the last part about the honey being better, it's true. Honey from new, freshly made comb is of a higher quality than honey from older comb.

**The key problems with TBHs are hardly ever mentioned** in sales pitches and on websites dedicated to them. The big issue is the long horizontal shape of the hive. A newly installed package needs to be fed protein and carbohydrates, since packages arrive when weather is still variable in the Northeast and flight or even blooms may be unavailable. There is no good way to feed inside the hive except on the hive floor. Protein patties, dry sugar, syrup in Boardman or baggie feeders can be placed on the floor of the hive, but the cluster

isn't in contact with the feed. Boardman feeders only hold 1-2 quarts, baggies somewhat more, but still only enough for 1-2 days of feeding if the bees can reach it. This is why many hives die even before summer is in full swing. Open feeding is a possibility, if it is warm enough for flying. But barrel feeding spreads disease and causes bee deaths from fighting and possibly drowning. I didn't find mention anywhere in TBH literature of the risk that inexperienced beekeepers may actually harvest combs full of thick sugar syrup instead of real honey; this will happen if the beekeeper succeeds in feeding the bees but didn't rearrange the combs so combs for later harvest were sequestered behind a follower

Beautiful drawn-out comb  
in mid-Summer 2010



board. As winter weather progresses, the long narrow hive doesn't allow bees to find honey easily since they instinctively rise up as winter goes by. There are only 2 inches of honey above the brood cluster in the fall. Bees in TBHs are forced to move horizontally or even down and around combs to reach available honey stores. Michael Bush of Bushfarms.com says you "need to have the cluster at one end of the hive at the beginning of winter (at least in Northern climates) so they don't work their way to one end and subsequently starve while leaving stores at the opposite end..." This is done by rearranging the combs in the fall and may save some colonies.

## TOP BAR EFFICACY IN NH

**In 2010, the Kearsage Beekeepers Association received funds from New Hampshire Department of Agriculture** to test the efficacy of top bar bee hives in NH. Wendy Booth, who served as technical advisor to the project, shared the final grant report with me; the following are excerpts from that report:

Cold, wet weather in the southern states where bee packages and queens are produced resulted in delays in the shipment of packages. When the packages were received in mid-May, many appeared weak and several absconded soon after being installed. In addition, the packages arrived too late to take advantage of the spring/summer nectar flow, the best source of nectar for most of New Hampshire.

Spring was followed by a dry, hot summer. The lack of rain resulted in a dearth of nectar and pollen until September or even October in some regions. Many queens stopped laying eggs by July due to the lack of food resources and did not resume until September. On a few of the hotter days, some of the heavier wax combs, softened by the high temperatures, began sagging and many broke from the top bar.

Of the 36 top bar hives, 9 were reported lost before winter due to absconding, swarms, queen failure, or starvation. 26 of the remaining 27 colonies died during the winter and early spring. Only 1 out of 36 colonies survived the winter. That hive had been combined with a Russian hybrid nucleus colony back in mid-August, because the original Italian queen was observed to have stopped laying eggs and did not resume after feeding for several weeks.

Top bar hive beekeepers have often claimed that they observe low levels of Varroa mites in their hives and do not have to treat the hives, but the





more experienced participants in this project found these claims questionable. Higher mite levels were observed in some of the stronger colonies that were able to build up to larger populations. Although many reported low mite levels, this was most likely due to the fact that these weak colonies had raised very little brood during the dearth in the summer.

Although top bar hives were touted as requiring very low input from the beekeeper, the more experienced beekeepers in this project recognized that the dry, hot weather might result in a shortage of food resources, and the

In conclusion, the project results are not necessarily a condemnation of top bar hive beekeeping in New Hampshire, but rather an indication of just how challenging it can be to keep honey bee colonies alive through a year of New England weather. Attempting to overcome these challenges in an alternative beekeeping system such as the top bar hive adds one more unnecessary complication. Although we found in this trial that over-wintering colonies in these top bar hives was more difficult than in Langstroth hives and [that] there are several design issues that need to be fixed, this project may not have been an adequate evaluation of the

methods in Langstroth hives before attempting beekeeping in top bar hives.

Add to this the experience of Tony Jadcak, Maine's State Apiarist:

I am aware of a couple KTBHs that actually made it through last winter, but the vast majority didn't to my knowledge. The same goes for the previous winter.

## TBH PROBLEMS TO OVERCOME

**Even TBH enthusiasts admit there are difficulties connected with the hive.**

The list below, "TBH Problems to Overcome," is taken from [topbarbees.com](http://topbarbees.com). My comments follow after each point.

- 1 *Challenging to start from a nuc or package bees.* Make that "impossible" with a nuc and "risky" with a package, since you can't feed the bees copiously and easily.
- 2 *More care needed with overwintering.* The TBH is meant for warm climates, where bees can move constantly through the entire length of the hive cavity. They typically starve or freeze in TBHs in the Northeast.
- 3 *More management needed to prevent swarming.* This is because the hive is too small. Swarms are the number-one cause of anti-beekeeping ordinances in urban/suburban areas. Swarms are often frightening to the general public, leading to complaints—and TBH are significantly more prone to throwing swarms due to brood nest congestion. In addition, unlike a Langstroth setup where the beekeeper will likely have extra supers, etc., to retrieve a swarm in, the new TBH beekeeper generally has no extra hive and leaves the swarm to find its own cavity. "The increased swarming tendency is enough of a reason that all but the most experienced urban and suburban beekeepers should **not** use TBH," says EAS Master Beekeeper Erin MacGregor-Forbes.



Late Spring 2011 brings bad news: dead colony. PHOTOS: SCOTT FORBES

new colonies would not be able to draw enough comb, rear enough bees, and gather enough food during the short season. These beekeepers continued to feed the bees sugar syrup and/or pollen from the time the bees were hived in May, until late fall in November. Even then, some reported that they did not think the bees had stored enough honey to make it through the entire winter. Either due to lack of experience or infrequent inspections, most participants did not continue to feed beyond the first month after installing the bees. Many of the hives died between January and March.

hives due to the encountered problems unrelated to hive design. The project resulted in over 97% loss of colonies, but many of those losses stemmed from weak packages and queens, unfavorable weather, and lack of beekeeper experience. The same beekeepers that lost colonies because they did not continue feeding likely would have lost new packages installed mid-May on foundation in Langstroth hives as well.

What can be inferred from this project is that the top bar hives are likely not for beginning beekeepers. These beekeepers would be more successful learning to keep bees using traditional

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- 4 *Burr comb and cross-bar comb more difficult to manage.* This can be overcome with experience.
- 5 *Comb attachment to sides of hive.* Occurs with new comb, and can be overcome with experience.
- 6 *Comb breakage; need to handle top-bars carefully.* Again, this can be overcome with experience, though points 4, 5 and 6 may cause a beginner to just give up, and then the hive won't have removable combs at all.
- 7 *Lower honey production.* That is because the hive will almost certainly swarm each summer and have to be re-started after it dies that winter of freezing or starvation.
- 8 *More drone brood production than Langstroth.* That's true, but bees generally raise the proper amount of drones for the colony's size no matter what style hive, if they are not given foundation.

Dr. Tom Seeley of Cornell did many studies of feral hives in trees and found that they always had about 17% drone comb. Even with the current IPM practice in Langstroth hives of having two drone combs in the brood chamber to catch Varroa mites, that's only 10% drone comb. We aren't used to seeing 17% drone comb, so it seems excessive. Drone brood does attract more Varroa mites than worker brood, and acts as an incubator for more mites. Without regularly removing the drone brood to kill mites, the hive may become overrun by midsummer and crash.

- 9 *Bees prefer to move through a hive vertically rather than horizontally.* YES! That's the key factor against TBHs in the Northeast. I'm very glad the author included this point, though it is next-to last on the list.
- 10 *More experimentation needed to achieve optimum results.* True. For example, to successfully overwinter their bees, some TBH users have begun to add compo-

nents on top of the hive, which gives it a more vertical shape. Sound familiar?

I hope the reader benefits from my research thus far, and will consider doing their own research as well before choosing to use a top bar hive in a cold climate. If you do choose this style hive, please learn all you can about bees first, and don't just wish the bees and the weather would act like humans want them to act. Learn from experienced beekeepers, observe your colonies, take notes, and collect the data. It can mean life or death for the bees, after all. ▲

*Anne Frey has had bees since 1989, but has only considered herself a beekeeper since 1994. She worked for a commercial beekeeper from 2000 to 2003, became an EAS Master Beekeeper in 2002, and from 2003 to 2007 was president of SABA (Southern Adirondack Beekeepers Association). She currently runs 20 hives in New York state.*

## Open-Feeding "Pollen Substitute"

by Erin MacGregor-Forbes, Master Beekeeper

Many years, we have a warm spell after the first frost and the bees can fly, but find nothing in the "field." In the absence of nectar and pollen, our bees start foraging for alternative sources of carbs and protein. Bees pick up sand, sawdust, birdseed, or maybe even soda in some cans in a recycling bin on a neighbor's back porch, etc., to bring home to the hive. Pretty soon the neighbor's back porch is "abuzz" with activity, and it only takes one complaint to create a Bee Ordinance. So I open-feed "pollen substitute" in the fall after the flow shuts off. I don't do this to provide protein to my hives (it does to some extent, but isn't significant); I feed to give my bees something productive to do in my own yard. The point is to keep the bees busy and happy foraging at home, not at my neighbor's house.

Simple Recipe: 4 : 1

Soybean Flour : Brewer's Yeast

Deluxe Recipe: 3 c Soybean Flour

1 ½ c Brewer's Yeast

2 tsp Sea Salt

1 tsp Vitamin C Powder

6 Tbsp Dry Milk Powder

Sift the mixture together and put about 2 cups into the bucket every day while the bees are flying. As time goes on and the days get shorter and colder, it is normal for them to take less and less. If you like, feed commercial pollen substitute by sifting it to break up the clumps.



**Strategy:** cut-off two-thirds of the lid of a 5-gallon bucket; snap the remainder of the lid back onto the bucket. Put "pollen" into bucket; set out in yard on its side so the lid acts as a gate (so the bee's wing action won't blow the "pollen" out of the bucket).

The first day, bait the bucket with a drizzle of honey on the rim. The bees are attracted by the honey smell and then quickly clue in to the "pollen." Do not open-feed sugar syrup, as the bees fight over syrup. I have never seen any conflict at my open pollen feeding stations. Place your stations a good distance from the hive, and somewhat protected — there will be a lot of activity.

Bring the buckets out in the morning and set them in the same spot every day. At night, bring them inside to prevent moisture buildup. In the morning, re-fill and set out again. ▲