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Beekeeping with top-bar hives

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Between 2002 and 2004, beekeepers in Tobago, in cooperation with Bees for Development, experimented with the use of top-bar hives. The information and pictures shown here are from the research conducted within the Project³.



Picture 1 An apiary in Tobago with top-bar hives and frame hives

1. INTRODUCTION

Congratulations on owning your first top-bar hive. Once a colony is established in the hive, you will be delighted to see bees building beautiful, elliptical combs in their own fashion. The top-bar hive provides a home for a honeybee colony, while the technology involved in their management is simple and inexpensive for the beekeeper.

Beekeeping using frame hives (Langstroth, National, Smith, WBC etc) depends upon complicated equipment constructed with precision. Boxes must fit together exactly and the spacing between adjacent frames is critical in ensuring the correct bee spacing. In addition, frame hives require carefully planed and seasoned timber, as well as excluders, eyelets, nails and wire. The beekeeper

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needs access to supplies of foundation and other inputs, and an extractor for spinning honey out of the frames. These requirements make frame hive beekeeping inappropriate in areas of the world where such resources are not available, or are prohibitively expensive. The top-bar hive is an endeavour to bridge the gap between the most basic receptacle-type hives (for example, the skep), and more expensive frame hives. These aim to combine the low-cost benefits of local-style hives with some of the advantages of frame hive beekeeping. The only critical measurement in (these) low-technology, top-bar hives is the width of the top bars, which must provide the correct space for bees to build their comb and maintain a constant temperature.



Picture 2 *A comb with bees from a top-bar hive*

Top-bar hives are not a new invention: the Greeks were already using a basket hive with top-bars in 1682, and in North Vietnam, top-bar hives were used traditionally for *Apis cerana* beekeeping. In Africa, top-bar hives were first introduced to beekeeping projects in Kenya in the mid-1960s. Since then projects in many countries have developed their own styles of top-bar hive, based on the resources available and the colony size of local bees.

Top-bar hives have the same advantages of manageability and efficient honey harvest as movable-frame hives, but at a lower cost, and without the recurrent cost of foundation and other inputs. To allow manageability, bees are encouraged to construct their combs suspended from the undersides of a series of bars. These bars allow individual combs to be lifted from the hive by the beekeeper. The hive body, as with local style hives, may be constructed from whatever materials are available. Many different designs have been published (for example Aidoo, 1999; Sakho, 1999; Mangum, 2001).

Different types of top-bar hive can be constructed by the beekeeper, although village carpenters are often requested to cut the top-bars from planed timber; top-bars must be of a precise size because they must provide the same bee spacing for combs within the hive, as the bees would use in the natural nest. This bee spacing will depend upon the species and race of honeybee. As a very general guide, *Apis mellifera* of European origin need top-bars 35 mm wide, African races of *Apis mellifera* need 32 mm, and *Apis cerana* need 30 mm. The best way to determine the optimum width is to measure the spacing between combs in a naturally-built nest of the same bees.

Another advantage of this type of equipment is that it opens up beekeeping to new groups of people. For example, in Africa, forest beekeeping tends to be a male-only activity where bark

hives are made and kept deep in forests. Harvesting from these hives can involve travelling far from home and camping overnight in the forest – usually not feasible or acceptable for women. Groups of women beekeepers may find it convenient to begin beekeeping with top-bar hives that can be made and kept close to home. Further, top-bar hives facilitate the introduction of sustainable beekeeping in remote communities where this activity was previously non-existent. Top-bar hives can also be an excellent and cost-effective way of housing large numbers of colonies for pollination purposes.

2. GETTING STARTED WITH YOUR FIRST TOP-BAR HIVE

As with all beekeeping, there are no fixed rules for keeping bees in top-bar hives! These are just hints for your guidance.

Preparing the top-bars

The use of 'starter strips' is recommended as they strengthen the bond between the comb and the top-bar and encourage the bees to build comb parallel to the top-bars. Strips are made by cutting a sheet of beeswax foundation horizontally into 1½-inch lengths: this measurement does not have to be precise. The strip is installed in the top-bar the same way you would with a sheet of foundation in a rectangular frame. If beeswax foundation is not available but beeswax is, melt and pour the wax to make a sheet then cut it in strips. If beeswax is not available, the top-bar can be used as it is, however it is less likely that comb construction can be influenced by the beekeeper.

Introducing bees to your top-bar hive

If you previously had no bees, there are at least three ways to get started. The simplest way is to set up the hive, rubbed inside with some beeswax to give it an attractive scent, and wait for it to be occupied by a passing swarm of bees. This will be successful only during the swarming period, and in areas where there are still plenty of honeybee colonies.

Alternatively, you can buy packaged bees and a queen and introduce them to the hive as you would with frame hives.

For those with beekeeping experience, you can get your top-bar hive going by transferring a wild nesting colony (*Apis mellifera* - indigenous or feral) into your hive. The wild colony will already have a number of combs and these can be tied carefully to the top-bars of your hive, using a piece of string, vine, or thin strips of masking tape.

If you already have bees in frame hives, it is easy to get your first top-bar hive going: simple locate your top-bar hive, fitted with prepared top-bars, next to a frame hive colony and shake the bees from the frame hive into your top-bar hive. Take precautions to ensure that the queen is not injured or lost in the process. Remove the frame hive when the transfer is complete. Feed the hived top-bar colony to ensure they build comb quickly.

Alternatively, you can form a nucleus in the top-bar hive by transferring the queen and bees from a few brood combs of a frame hive colony into the top-bar hive. Locate the top-bar hive colony a 'safe' distance away from the frame hive colony when the transfer has been completed and feed the nuc. to accelerate comb build-up.

You can reduce the 'down-time' in the newly established top-bar hive colony or nuc. by having comb constructed on top-bars before transferring bees to the top-bar hive. This can be achieved by installing top-bars, fitted with foundation strips, at or near the centre of the brood nest of one (or several) frame hive colony (colonies). Locating top-bars at or near the centre will potentially maximize the number of worker cells the bees will build when drawing-out the comb. The drawn-

out top-bars are removed from the frame hive(s) colony/colonies, and placed in the top-bar hive being furnished just before the bees are transferred.

Where top-bars are placed in the same frame hive colony that will be used eventually to establish a top-bar hive nuc., the transfer process will simply involve moving the drawn out top-bars and their adhering bees from the frame hive to the top-bar hive.

Depending on the length of time the top-bars have been left in the frame hive colony, you may have to cut the drawn top-bar comb, (which may possibly contain brood), to fit the top-bar hive.

Once the bees have been installed in your top-bar hive, a 'division board' may be used to reduce the size of the hive cavity occupied by the bees. The location of the division board should be periodically adjusted as the colony size increases.

Comb construction

Bees never do things exactly as we would like them to, so it is important to monitor how the bees build their comb when using top-bar hives. Bees will usually draw-out comb using the strips of foundation as a guide, but when they feel like it, they will build 'cross comb'. Cross comb could frustrate your top-bar hive experience if it gets out of hand. If you observe cross comb being built, remove the top-bars supporting the cross comb, cut out the built comb, replace the foundation strips and reinstall the bars. If the top-bars with the cross comb also contain sealed brood or stored food (nectar& pollen), the bars can be placed furthest away from the entrance of the hive to allow time for the brood to hatch or the food to be consumed before the comb is removed.

European the bees in top-bar hives will often attach the comb to the sides of the hive during the comb building process, seemingly more so when the comb is being built during a heavy nectar flow. This is presumably to provide additional support for the comb. Do not worry about this phenomenon; it will stop as the comb gets older. (Comb attachment is dealt with in Section 3).



Picture 3 Wellete Toby-McMillan examines the bees in one of her top-bar hives

3. LOOKING AFTER THE COLONY

Managing bees in top-bar hives involves the application of the same principles that apply to managing bees in frame hives. However, there are a few differences in how the principles are applied. Here are some of the things you have to pay attention to when looking after your top-bar hive colony.

Entering the hive

The top-bars of your hive are like a xylophone. Using your hive tool like a wooden hammer, play the top-bars on your hived colony and listen to the varying sound. The top-bars with only foundation strips will have a more hollow sound than the bars with drawn comb. The bars with honey bound comb will have the most compact sound. Play your xylophone before entering the hive to gauge what's happening inside. Playing a tune for too long a period may disturb the bees, so do not get carried away with your instrument.

Enter the hive by first removing the top-bar furthest from the entrance or the top-bar adjacent to the

division board if one was installed in the hive. Look inside the hive to determine how well you assessed what is going on inside while playing your xylophone.

Moving or removing top-bars



Picture 4 You will soon learn how to handle top-bars and combs carefully. Here a bundle of leaves is used to sweep bees gently off the comb.

Care must be exercised when moving the top-bars with drawn-out comb in the hive, from the hive, or when manipulating them after they have been removed from the hive. Top-bars not handled correctly will break, particularly if the comb has a lot of stored honey or brood.

Remember that bees will most likely attach newly drawn comb to the side of the hive. Ensure the comb is not attached before attempting to lift the top-bar out of the hive, or slide the bar along the length of the hive. When necessary, use a knife or the sharper end of your hive tool to detach the comb from the side of the hive. Be on the look out for burr comb used to attach comb from adjacent top-bars.

When lifting the top-bars out of the hive, keep the bars in a horizontal position. Once the bar is out of the hive, one end may be pivoted to a vertical position, to facilitate comb inspection. The vertical bar can then be further pivoted in a full circle -360 degrees. The general idea is to keep the comb (not the top-bar) always in a vertical position, since unlike frame hives, the comb is only attached at one end and has no supporting wire.

Note however that top-bars with honey-bound comb should always be kept in a horizontal position to avoid breakage.

After a while, you will get the hang of manoeuvring top-bars with comb, and will work out for yourself what is, and is not possible.

If a comb containing brood breaks, carefully tie the comb to the top-bar and replace in the hive.

4. HARVESTING HONEY

With frame hives, honey is obtained by spinning the frames in a honey extractor. The empty combs are later returned to the hive. By this 'recycling' of comb, frame hive beekeeping contrives to make honeybees put effort into honey production rather than comb (beeswax) production. The yield of beeswax from frame hive beekeeping is, therefore low compared with top-bar hive beekeeping methods. Data collected from a comparative study of the use of top-bar hives and frame hives for honey and beeswax production in Tobago, West Indies during 2002-2004 revealed that 3.32 kg of honey was harvested for every 1 kg of beeswax harvested from top-bar hives, compared to 11.25 kg of honey for every 1 kg of beeswax harvested from frame hives. The study confirmed that top-bar hives yield a higher ratio of beeswax to honey compared with frame hives.



Picture 5 Harvesting honeycombs from top-bar hives

Harvesting honey from top-bar hives is quite simple and can be achieved without damage to the colony. The beekeeper selects combs containing honey but no brood: these will usually be the combs furthest way from the entrance.

All that is needed to harvest honeycomb from a top-bar hive where the honey will be eventually marketed as 'liquid honey', is a bucket with a lid, and a knife. Sealed honeycombs are removed from the hive, the bees are brushed off the comb which is then cut over a bucket leaving a half an inch strip of honeycomb on the top-bar. The bar is then replaced on the hive. Note however that the half-inch strip of honeycomb is left only on those top-bars where the alignment of the comb was 'acceptable' to the beekeeper, so as to encourage 'proper' rebuilding of the comb.

The bucket with honeycomb is taken home where the wax is separated from the honey by filtering through a sieve, or using a press.

Top-bar combs make beautiful cut comb sections. Honeycombs that are to be marketed as cut sections should be placed in mini top-bar hives, (nucs, that can hold 4-6 top-bars), rather than buckets, to avoid breakage of the comb and to facilitate transported from the apiary to the beekeepers home.



Picture 6 Honey press being used by Gladstone Solomon. The press was designed and built as part of the Project.

5. FURTHER INFORMATION

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Journal

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Videos

Clauss, B. 1995 African honeybees: how to handle them in top-bar hives (PAL/VHS) 22 min.

Wendorf, H. 1999 Beekeeping in development (PAL/VHS) 81 min.

Bees for Development offers information and advice to all concerned with apiculture as a useful part of sustainable, rural livelihoods in developing countries. **Bees for Development** was founded in 1993 in response to the international need for a specialist organisation devoted to this sector, and functions at the heart of a network enabling sharing of information between everyone working in this field. **Bees for Development** manages research and development projects, organises training, provides information, and publishes the quarterly *Bees for Development Journal*.

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