

PRACTICAL BEEKEEPING

Making a top-bar hive

Janet Lowore, Monica Barlow and Mark Loveday, Bees for Development

Keywords: hive design, movable comb, top-bar

Top-bar hives are easier and cheaper to make than frame hives, yet have some advantages of movable comb technology. Compared to fixed comb hives they allow the beekeeper to remove and replace comb after inspection. Importantly they allow bees to make their own comb, and no queen excluder is used. The bees are able to live a natural life and it is believed that this can contribute to their health and vigour.

A top-bar hive comprises a hive body, top-bars and roof. It is often recommended that the hive body has sloping sides, reflecting the shape of naturally made comb so that the bees are less likely to attach comb to the sides of the hive. In the design described here, sloping sides are shown with an angle of 10°, this is the angle of the slope to the perpendicular.

Top-bars

The width of the top-bar is the most important measurement for the whole hive and depends on the size of the honey bee in your local area. For temperate zone races of *Apis mellifera* the top-bar width should be 35 mm. With tropical African races of *Apis mellifera*, the width should be 32 mm. The length of the whole hive should be multiples of the width of the top-bar. It is advisable to make an allowance of an extra 10 mm at the end of the hive to allow for the top-bars to expand and for propolis. Typical numbers of top-bars in a hive are 25-28.

With temperate zone races of *Apis mellifera* therefore the total length (inside measurement) of the hive body for a 27 top-bar hive should be:

$$27 \times 35 \text{ mm} = 945 \text{ mm} + 10 \text{ mm expansion allowance} = 955 \text{ mm}$$

With African races of *Apis mellifera* the total length should be:

$$27 \times 32 \text{ mm} = 864 \text{ mm} + 10 \text{ mm expansion allowance} = 874 \text{ mm}$$

In this design we are using top-bars 460 mm long and 18 mm deep.

Assembly

To make it easier to assemble the sloping sides of the hive it is advisable to make a follower board first and then build the hive sides and ends around this. Cut a piece of timber using the dimensions shown in Picture 1 and screw it on to a top-bar. If you make sure the mid-line is perfectly central and vertical you can use the measurements to achieve the correct angle of slope. Cut out the shape and attach it to one top-bar.



Picture 1.
The follower board can be made first and used as a template to assemble the sloping sides

Slope
This angle is 10° greater than a right angle

Making the hive body

The hive sides should be 955 mm by 270 mm. The length of 955 mm is to allow for 27 top-bars of 35 mm width, plus 10 mm for expansion. To obtain the correct width you can use narrow planks, joined together using battens. One batten at each end of the sides also helps in the construction: the end pieces can be nailed or screwed to the battens. An additional batten in the middle of the long side adds strength. Old floor boards with tongue and groove can be used for the long sides. The ends can be made rectangular in shape 540 mm by 330 mm. Make the hive upside down as shown in Picture 2. Place the follower board upside down so that it is resting on the top-bar, also upside down. Hold the two sides against the follower board – get your helper to hold the long sides while you nail or screw the ends to the battens. Picture 3 shows the assembled hive ready to have the floor put on.



Picture 2. Assembling the hive body, upside down, using the follower board as a template

Batten attach one to each end of each long side, with the option of another in the middle



Picture 3. Hive body, still upside down, ready for the floor to be fastened on

Floor

Where *Apis mellifera* are infested with the *Varroa* mite it is advisable to use a mesh floor. Stainless steel mesh can be bought by the metre but is expensive. Plastic netting is cheaper, although less durable. Mesh apertures must be wide enough to allow the *Varroa destructor* mites to fall through. A *Varroa destructor* mite is 1.0-1.8 mm wide and 1.5-2.0 mm long. Mesh is measured in wires per inch (that is 10 mesh has 10 wires per inch, which gives an aperture of 1.98 mm; 6 mesh has 6 wires per inch which gives an aperture of 2.98 mm).

In tropical countries ants are a serious threat to bees and therefore we recommend a solid hive floor.

Roof

The roof must protect the hive from rain and sun. It can be flat or sloping and made with any suitable materials. Pictures 4 and 5 show examples of completed roofs.



Picture 4. This roof is made from a piece of plywood with a timber rim or lip. It is covered with roofing felt for waterproofing.



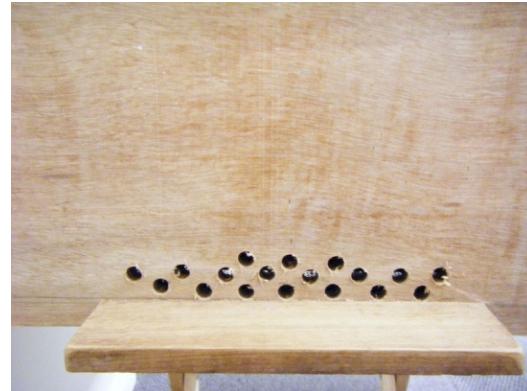
Picture 5. Ridged roof. This alternative top-bar design was conceived by Phil Chandler. *See further reading.*

Entrance

Entrance holes for the bees can be made in one of the end pieces of the hive, or in the long side as shown in Picture 5. In temperate countries a landing board can be added -

this allows the bees to land and then walk into the hive (see Picture 6). In tropical countries, predators such as lizards can sit on the landing board and eat bees as they land, therefore landing boards should be avoided.

Picture 6. Hive entrance with adequate holes and landing board



Finishing the top-bars

The dimensions of top-bars have been discussed above. A groove should be cut along the length of the bar and this can be filled with molten beeswax. When hard this helps as a starter guide, encouraging the bees to build their comb. It is useful to find some way to keep the top-bars in place at the sides of the hive. One way to do this is to make a narrow rebate on each end or a small saw cut. If the hive's long sides are straight sided planks placed in a sloping position they will present a sharp corner uppermost and a top-bar with a small saw-cut will sit neatly over this edge and stay in position. Picture 7 shows the hive with top-bars in place.



Picture 7. Top-bars in place. One top-bar is turned over to show the groove and the end saw-cut which helps keep the bars in place. The mesh floor can be seen.

Choice of materials

Use wood that you have available. Plywood is usually too thin and not robust enough to withstand very wet weather. If the wood is not naturally weather resistant, paint the hive with a mixture of warmed wax and linseed oil, or environmentally-friendly paint.

Follower board

The follower board is used as a template, and it is also used as a dummy board. You can insert the dummy board inside the hive to reduce the internal space for the bees, and move it as the colony grows. This is helpful in colder climates as it reduces the space which the bees must keep warm. *Tip:* make two follower boards when you begin. Keep one as a template (do not fasten it to a top-bar) to use if you need to make a feeder, or want to make another hive the same size.

Stand or legs

The hive should stand at about waist height and can be supported by legs attached to the hive, or a separate stand can be made. In tropical countries where the threat from honey badgers is high, hives are often hung between trees using wire. Smearing the wires with grease can deter ants.

Summary of dimensions	
Hive part	Dimensions
Top-bar for temperate zone races of <i>Apis mellifera</i>	460 mm x 35 mm
Top-bar for tropical zone races of <i>Apis mellifera</i>	460 mm x 32 mm
Long sides	955 mm x 270 mm (27 bars of 35 mm, plus 10 mm for expansion)
Battens	270mm x 34 mm x34 mm
Ends	540 mm x 330 mm
Follower board	260 mm high, top 400 mm wide, bottom 300 mm wide
Floor	Make to fit
Roof	Make to fit (the roof should have an overlapping lip for maximum protection)

Tools and materials required

Screws or nails
Wood glue
Roofing felt or polythene (to weather proof the roof)
Hand saw
Drill (small drill bit for pilot holes for screws if used in hive construction, 10 mm screw bit for making entrance holes)
Screw driver
Ruler
Square
Bench or table
Sander or plane (if wood is rough)

Further reading

- BfD Journal 68.* Better beekeeping in top-bar hives: hives and hive making.
BfD Journal 69. Better beekeeping in top-bar hives: entrances and roofs.
Beekeeping with top-bar hives www.beesfordevelopment.org/portal
How to build a top-bar hive by Phil Chandler www.lulu.com/content/815182
Instructions for building a top-bar hive topbarbees.wordpress.com/about/construction/
Making a feeder for a top-bar hive www.navitron.org.uk/forum/index.php

The pictures used in this article were taken at a recent **Bees for Development** weekend course on Sustainable Beekeeping, held at Ragman's Permaculture Farm, Forest of Dean, UK. Similar courses will be held in 2010: watch www.beesfordevelopment.org for details.