

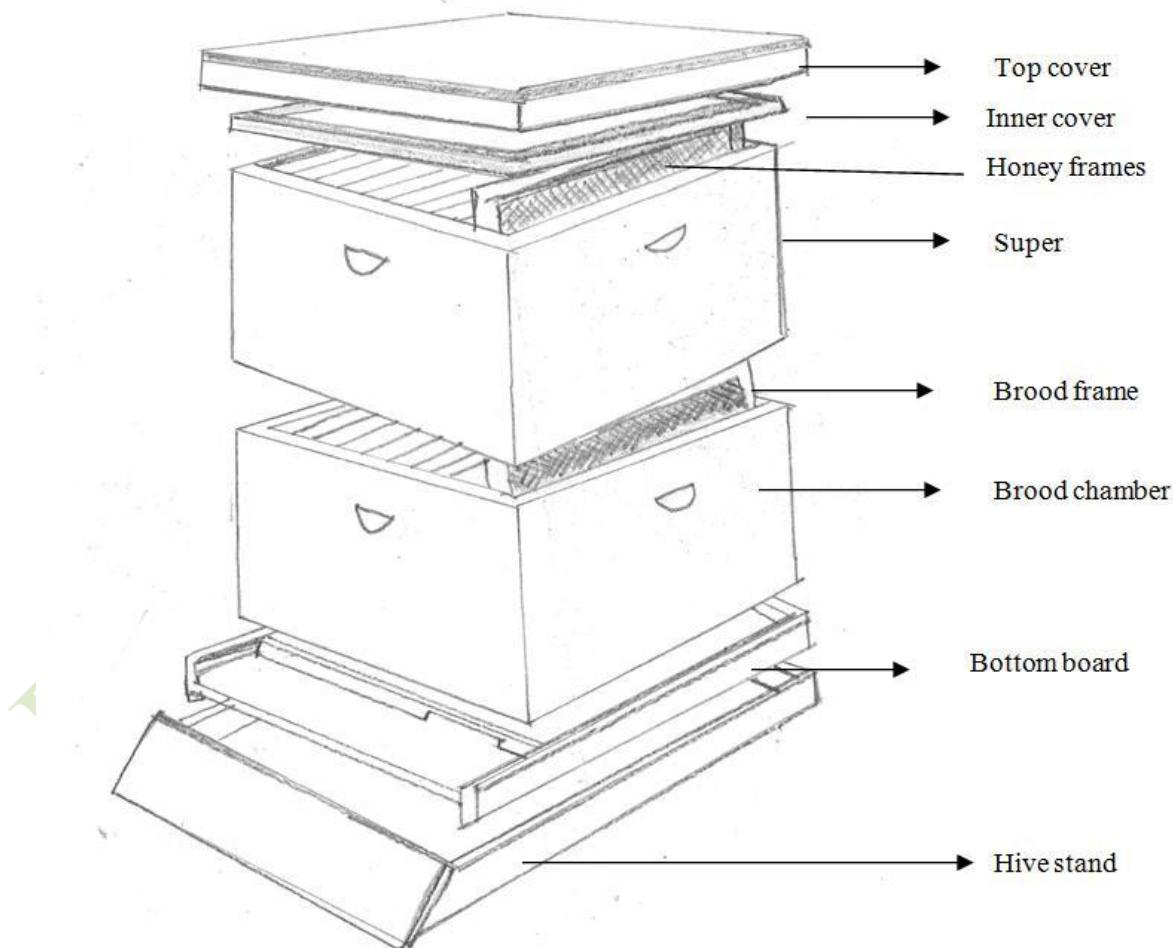
## PRACTICAL 6

### BEE KEEPING EQUIPMENT

**Aim:** 1) To become familiar with different equipments used in modern beekeeping for domesticating hive bees.

2) To get detailed information on structure and size of movable frame hives used for domestication of *Apis cerana* and *Apis mellifera*.

**1. Bee hive:** L.L. Langstroth discovered the principle of bee space in 1851 in the U.S.A. This space permits free passage for worker bees and is too small to build a comb by bees or too large for depositing bee glue i.e. propolis. We can say that bee space is optimum distance between two surfaces in a bee hive essential for normal movement and functioning of bees. This principle was a big discovery for modern beekeeping. The modern hive has been designed on the bases of principle of bee space in which frames can be easily moved. The bee space measures 9.52 mm for *A. mellifera* and this was modified for *A. cerana* to be between 7 and 9 mm. Different parts of a movable frame bee hive are shown in Fig. 6.1.



**Figure 6.1 Parts of a movable frame hive**

**Stand:** To support bottom board.

**Bottom board:** It is floor of the hive having an entrance for bees. On this board brood chamber rests.

**Brood chamber:** Chamber used for rearing of brood. Frames are placed in this chamber on which bees raise combs. The dimensions and number of frames vary with the type of hive. A wooden dummy board is used to limit the size of brood chamber and is placed at the end of brood frames.

**Frame:** Each frame consists of a top bar, two side and a bottom bar. Inner aspect of the top bar has a groove for fixing comb foundation sheet. Side bar has 4 holes for wiring the frame. The frame holds a comb.

**Dimensions of hive:** In general for *A. mellifera* we use Langstroth hive (named after L.L. Langstroth) and for *A. cerana*, BIS (Bureau of Indian Standard) hive A and B type. In 1995, BIS introduced C-type hive based on Langstroth hive, for *A. mellifera*. Well seasoned wood of “Kail”, “Toon”, teak or rubber can be used for making good quality bee hives. Wood having strong smell is not used. Dimensions of different types of bee hives being used in India are given below:

**Table: Dimensions of bee hives**

Hive parameters	BIS hive C type for <i>A. mellifera</i> (Langstroth type; Fig. 6.2b))	BIS hive A & B type for <i>A. cerana</i> (Modified Newton and Jeolikote types; Fig. 6.2a)
<b>Frames</b>	Contains 10 frames	May contain 4, 8 or 10 frames
<b>Super Chamber</b>	Generally full super chamber is used.	Half (shallow) super chamber is generally used.
<b>Brood/super frame size</b>	Outside 448x232mm Inside 428x192mm	<b>Type A: Modified Newton Type</b> Outside 230x165mm Inside 210x145mm <b>Type B: Modified Jeolikote Type</b> Outside 300x195mm Inside 280x175mm
<b>Bee space</b>	10 mm	<b>Type A</b> 7 to 9 mm <b>Type B</b> 8 or 9 mm

**Super:** Dimensions may be same as that of brood chamber or half of it (depending on type of bee hive). This is the chamber where bees store surplus honey.

**Inner cover:** A board which acts as a partition between brood/super chamber and the roof .

**Top cover:** A type of lid acting as roof placed over inner cover.

**2. Nucleus hive:** Small bee hive for keeping 4-6 frames. These are used for mating of queens and division of colonies.

**3. Observation hive:** Small hive with glass sides so as to observe movements and behaviour of bees.

- 4. Comb foundation mill:** Used to print natural cell size of desired comb foundation sheet for *A. mellifera* and *A. cerana*.
- 5. Bee veil:** Used for preventing bee stings on face and neck.
- 6. Smoker:** Used to calm down the bees while opening the hive.
- 7. Uncapping knife:** Large sized knife used to uncap the frames before honey extraction.
- 8. Hive tool:** An iron strip used for opening of hive and it's cleaning.
- 9. Queen cell protector:** A spring like structure for protecting queen cells.
- 10. Queen cage:** Used to introduce a queen to new colony and also to transport the queen.
- 11. Bee brush:** To brush the bees from frames.
- 12. Feeders:** Different types of feeders are used for feeding sugar syrup to the bee colonies. (Fig. 6.8). These can be (i) slow feeder (friction top pail feeders) in which holes are made in the lid and the feeder is placed inverted inside the hive (ii) fast feeder (division board feeder) which is of the size of a regular frame and the trough contains a wooden float inside the cavity.
- 13. Swarm basket:** Basket to catch bee swarm.
- 14. Queen excluder:** Perforated zinc sheets or round wires assembled in such a way that workers can pass through them and queen cannot (perforation size is 4.20mm for *A. mellifera* whereas worker thorax size varies from 3.33 to 3.50mm). It is used during honey flow season to restrict queen to brood chamber and thereby preventing egg laying in the super. It is also used in maintaining multiple queen system in a colony.
- 15. Honey extractor:** It is a machine to centrifuge out the honey from uncapped frames.
- 16. Wax melter:** Double walled chamber for melting of bees wax for making comb foundation sheets.
- 17. Pollen trap:** For trapping corbicular pollen of returning bee foragers. For *A. mellifera* pollen trapping screen has holes of 4.7 to 5mm. and for *A. cerana* 3.5 to 3.7mm.
- 18. Bee escape:** To provide one way passage to bees.

#### **Practical things to do:**

- i. Draw diagrams of the equipment shown to you (size should be proportionate)
- ii. Record the dimensions of different types of hives being used for domestication of honey bees.
- iii. Record the perforation size of queen excluder of *A. mellifera* and *A. cerana*
- iv. Measure the size of holes in trapping screen of pollen trap.