

SHRI GURU RAM RAI UNIVERSITY

DEPARTMENT OF ENTOMOLOGY , SCHOOL OF AGRICULTURAL SCIENCES

Subject: MANAGEMENT OF BENEFICIAL INSECTS (BSAC-605)

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Q.: Describe different types of bee hives and bee keeping equipments .

Ans: BEE HIVES AND BEE KEEPING EQUIPMENT

Introduction

In modern apiculture, several types of hives are used. A hive is a wooden structure consisting of several parts. Primitive and rustic hives such as hollow logs, wooden boxes, baskets, clay pots, and clay cavities fixed in mud house walls were used for keeping bees in India until the late 19th century.

The hive developed on the principle of bee space by L. Langstroth (USA) in 1851 revolutionized beekeeping. In India, movable frame hives were introduced in the 1880s after the widespread adoption of Langstroth hives in the West. These movable frames allow easy inspection and management of the bee colony.

Types of Hives :

LONGSTROTH HIVE

The Langstroth hive, named after its inventor L.L. Langstroth, is the most widely used beehive design for modern apiculture. It is constructed using light but strong wood and follows the principle of "bee space," ensuring that the bees build their combs in a manageable way. The standard hive made of light and strong wood, widely used for *Apis mellifera*.

The Langstroth hive consists of several key components:

1. **Hive Stand:** It raises the hive off the ground, providing ventilation and protecting it from moisture and pests.
2. **Bottom Board:** The base of the hive where bees enter and exit.
3. **Brood Chamber (Hive Body):** This is the main section where the queen lays eggs and the worker bees nurture larvae. It holds several removable frames.
4. **Frames:** Wooden or plastic frames that hold the honeycomb (10). These are crucial for efficient hive management.
5. **Queen Excluder:** A perforated sheet that allows worker bees to pass but restricts the queen to the brood chamber, preventing egg-laying in honey storage areas.
6. **Super (Honey Chamber):** Placed above the brood chamber, this section is used for honey storage.
7. **Inner Cover:** Provides insulation and ventilation within the hive.
8. **Outer Cover (Hive Roof):** Protects the hive from weather conditions and ensures overall security.

The standardized Langstroth hive is now in use in most of the country for *Apis mellifera*. It allows easy inspection, honey extraction without destroying combs, and effective management of the bee colony.

- **Hives for *Apis cerana indica*:**
 - **Newton's Hive (7-8 frames)**
 - **ISI Meshy Hive (10 frames)**
 - **Jeolikote Villager Hive (7 frames)**

Bee keeping Equipments:

1. Bee Veil

Purpose: Protection of face and neck from stings.

Structure:

- Made of **black mosquito nylon netting**.
- Cloth at top and bottom.
- Elastic rim at the bottom to fit tightly around the neck.

Scientific Basis:

- Black netting reduces glare and improves visibility.
- Bees respond defensively to **dark, hairy surfaces** (they resemble predators like bears).
- The veil maintains a safe distance between skin and bees.

Practical Importance:

- Essential during colony inspection, honey extraction, and queen handling.
- Prevents accidental defensive responses triggered by breath (CO₂).

2. Gloves

Materials:

- Heavy canvas
- Supple leather
- Rubberized cloth
- Elastic at wrist

Function:

- Protects hands from stings during hive manipulation.

Teaching Note:

- Beginners benefit most.
- Experienced beekeepers often avoid thick gloves for better tactile control.
- Gloves must be cleaned regularly to remove alarm pheromones.

3. Overall (Bee Suit)

Characteristics:

- Loose-fitting garment worn over clothes.
- Preferably white.

Scientific Reason:

- Bees are less aggressive toward light colors.
- Dark colors (blue/black) stimulate defensive behavior.

Additional Features:

- Zippered front
- Elastic cuffs at wrists and ankles

4. Hive Tool

Structure:

- Flattened iron strip.
- One end sharpened.
- Other end bent at 90°.

Functions:

- Separating hive boxes.
- Loosening frames.
- Scraping off **propolis** (bee glue).
- Removing burr comb.

Scientific Insight:

Bees seal cracks with propolis, making frames difficult to remove. The hive tool overcomes this natural cementing behavior.

5. Smoker

Structure:

- Tin can body
- Bellows attached
- Spout for smoke direction

Fuel:

- Dry sack pieces
- Wood shavings
- Sawdust
- Dry leaves

Scientific Principle:

- Smoke masks alarm pheromone (isoamyl acetate).
- Bees respond by engorging honey (preparing for possible hive abandonment).
- Engorged bees are less likely to sting.

Important:

Smoke must be **cool**, not hot, to avoid burning bees or brood.

6. Bee Brush

Structure:

- Soft bristles.

Function:

- Gently remove bees from frames before extraction.
- Helps collect stray bees during swarm hiving.

Precaution:

- Use gently to avoid injuring bees or triggering aggression.

7. Uncapping Knife

Structure:

- Long, flat, sharp blade.
- Can be steam-heated or electrically heated.

Function:

- Removes wax cappings from sealed honey cells.

Scientific Note:

Bees seal mature honey with wax when moisture content drops to ~17–20%. Uncapping is essential before centrifugal extraction.

8. Honey Extractor

Type:

- Hand-operated or motorized centrifugal machine.

Working Principle:

- Centrifugal force removes honey without damaging comb.

Advantages:

- Comb preservation
- Increased honey yield
- Reusable comb improves colony efficiency

9. Queen's Cage

Structure:

- Rectangular wire cage.
- Holds queen and a few attendants.

Purpose:

- Introducing a new queen into a queenless colony.

Management Principle:

- Suspended inside hive for 24–48 hours.
- Allows gradual pheromone acceptance.
- Prevents immediate killing of introduced queen.

10. Queen Cell Protector

Structure:

- Cone-shaped spiral wire cage.

Function:

- Protects developing queen cell from worker destruction.
- Prevents emergence conflicts between rival queens.

Use in Queen Rearing Programs.

11. Dummy or Division Board

Structure:

- Wooden movable partition resembling a frame.

Functions:

- Regulates hive space.
- Maintains brood temperature (~34–35°C).
- Used in weak colonies.

Importance in Colony Thermoregulation:

Reduces stress during winter and dearth periods.

12. Comb Foundation Sheet

Material:

- Pure beeswax sheet embossed with hexagonal impressions.

Purpose:

- Guides bees in building straight worker comb.

Cell Density:

- *Apis cerana indica* – 20–24 cells/100 mm
- *Apis mellifera* – 19 cells/100 mm

Scientific Importance:

- Controls drone production.
- Enhances hygienic comb construction.
- Improves honey extraction efficiency.

13. Division Board Feeder

Structure:

- Wooden trough shaped like a frame.

Function:

- Holds sugar syrup during nectar scarcity.

Application:

- Stimulative feeding
- Dearth feeding
- Medicinal feeding

14. Plastic Bottle Feeder

Structure:

- 500 ml plastic bottle with small holes.

Function:

- External or internal feeding of sugar syrup.
- Economical and easy to use.

Use in Small-Scale Apiaries.

15. Queen Gate (Wire Entrance Guard)

Structure:

- Metal strip placed at entrance.

Function:

- Restricts queen movement.
- Prevents swarming escape.
- Helps in migration management.

16. Drone Trap

Structure:

- Rectangular box with two compartments.
- Wire funnels directing inward.
- Worker escape screen.

Working Principle:

- Workers escape through screen.
- Drones (larger size) get trapped.

Importance:

- Controls drone population.
- Helps in **Varroa mite** management (mites prefer drone brood).

17. Queen Excluder

Structure:

- Perforated zinc sheet (2.3–3.5 mm spacing).

Placement:

- Between brood chamber and honey super.

Function:

- Workers pass through.
- Queen and drones restricted.

Purpose:

- Prevents brood rearing in honey supers.
- Ensures clean honey production.

18. Pollen Trap

Structure:

- Plastic strip (~1.5 mm thick).
- 4.5 mm circular holes.

Working Principle:

- Pollen pellets dislodge when bees pass through holes.
- Pollen falls into collection tray.

Importance:

- Commercial pollen harvesting.
- Nutritional studies.
- Pollination research.