

APICULTURE

- ❑ Honey bee
- ❑ Species of honey bee
- ❑ Social organization of honey bee
- ❑ Life history
- ❑ Methods of bee keeping
- ❑ Products of bee keeping

- ◎ **Beekeeping** (or **apiculture**, from Latin: *apis* "bee") is the maintenance of honey bee colonies, commonly in hives, by humans.
- ◎ A beekeeper (or apiarist) keeps bees in order to collect their honey and other products that hive produces (including beeswax, propolis, pollen, and royal jelly), to pollinate crops, or to produce bees for sale to other beekeepers.

- Depictions of humans collecting honey from wild bees date to 15,000 years ago; efforts to domesticate them are shown in Egyptian art around 4,500 years ago.



- It wasn't until the 18th century that European understanding of the colonies and biology of bees allowed the construction of the moveable comb hive so that honey could be harvested without destroying the entire colony.
- Previously the method of extraction of honey was very much crude but after the invention of artificial hive by Longstroth(1951), it became scientific and commercial.

Honey bee classification

- Phylum Arthropoda
- Class Insecta
- Order Hymenoptera
- Family Apidae
- Genus Apis

Habit and habitat

Honey bees are:

- Organized social insects
- Active more in spring
- Exhibit polymorphism and division of labour.
- Bee hives hang down from the branches
- Workers communicate by the 'Waggle dance'
- Rate of dance \propto Distance of food

Species



Apis dorsata

Apis mellifera

Apis cerana



5 mm

Apis Dorsata F.



Characters:

- ⦿ Commonly called 'Rock bee'.
- ⦿ Largest bee of about 20mm, called the GIANT HONEY BEE.
- ⦿ A single comb makes 60 pounds of honey which Is maximum amount of a comb.
- ⦿ Workers pollinate 12,000 flowers daily.
- ⦿ Workers are very small and active , and due to their ferocious nature they are NON DOMESTICABLE.

Apis indica F.



Characters:

- ⦿ Commonly called as Indian bee or Asian bee.
- ⦿ Slightly smaller than *A.dorsata*.
- ⦿ Prefer to live in dark places by making parallel combs of one foot in protected areas.
- ⦿ This Is very gentle species so can be domesticated easily.
- ⦿ Production of honey is 6 to 7 pounds per comb, which is much less than the first one.

Apis florea F.



Characters:

- ⦿ Called as the little bee.
- ⦿ Smaller than the both species.
- ⦿ They are not gregarious i.e social. So make a single comb.
- ⦿ Due to docile nature i.e obedient, and rare stinging habit, their nest can be easily removed.

Apis mellifera F.



Characters:

- ⦿ It Is called as European bee.
- ⦿ Although bee produces less honey but it is the **BEST SPECIES** for **COMMERCIAL** point of view.
- ⦿ Its *ITALIAN variety* is reared everywhere in Europe and America in artificial hives.

Honey Bee Life Cycle



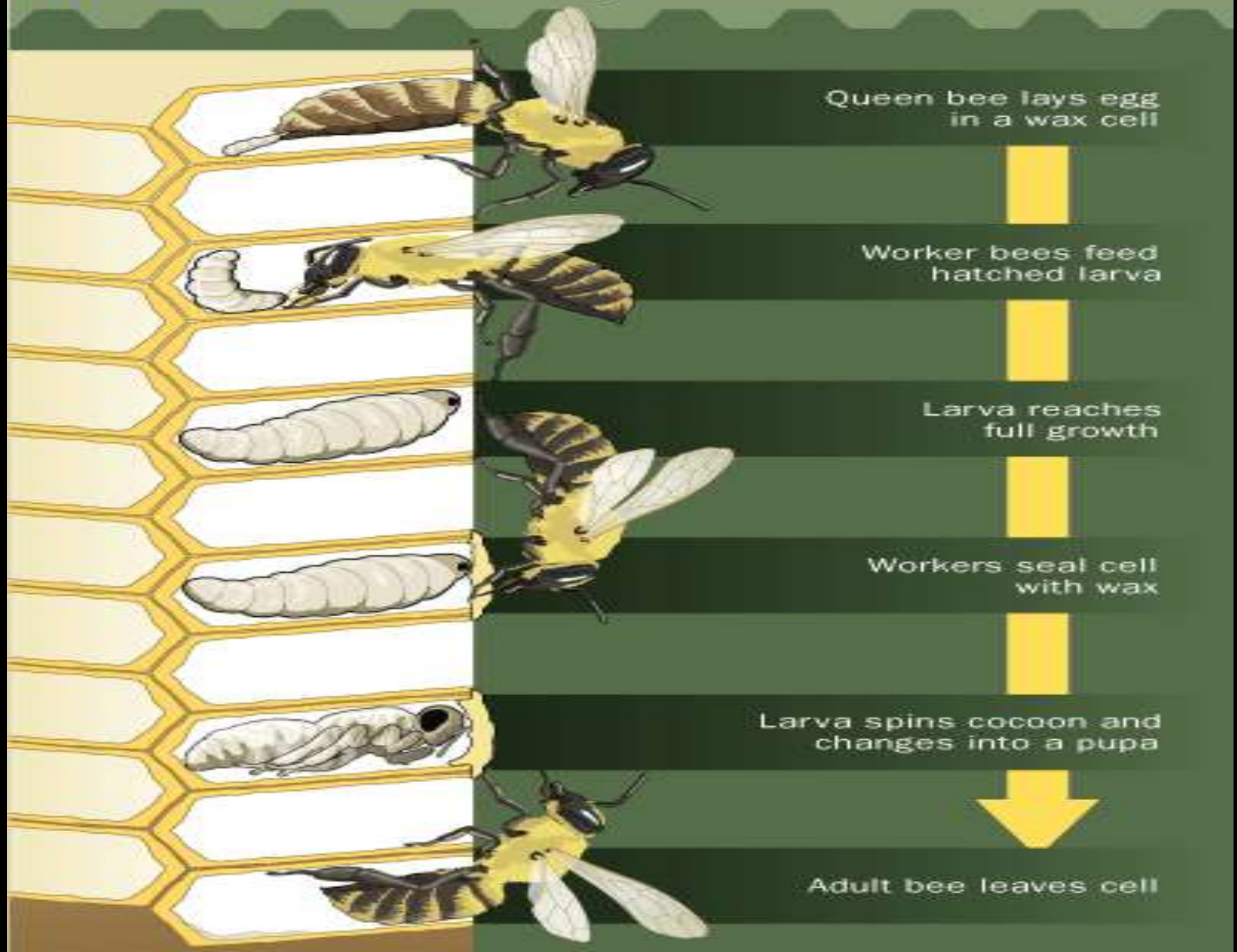
Honey Bee Life Cycle

Honey Bee Life Cycle



How Bees Work Life Cycle

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- ❖ **Royal jelly** consists of:
- ❖ Digested honey,
- ❖ Pollen,
- ❖ Mixed with a glandular secretion.



Swarming

- ⦿ The process of leaving off the colony by the queen is termed as swarming.
- ⦿ When Hive get over crowded in the summer by the food, the queen left the hive with some of the old drones and workers and establishes a new hive at another place.

In old hive, a worker is given the royal jelly and become new queen, and orders to kill the other sisters in the hive.



Supersedure.

- ⦿ When old queen dies or lost the ability to lay eggs, a new active and vigilant queen takes the place of old queen and is called the supersedure.



Absconding

- ⦿ When colony migrates from one place to other due to destruction of comb by termites or moths or due to scarcity of nectar producing flowers, it is called absconding.
- ⦿ It is different from swarming.

Nuptial or marriage flight

- ⦿ The second swarm is led by the 7 day old virgin queen which is followed by the drones.
- ⦿ Drone start copulating during the flight and dies after transferring the sperms.

Methods of apiculture

HIVE:

Two types of hives are used:

1. Indigenous method of bee keeping
e.g. wall or fixed hive
2. Movable hive.

Modern Method Of apiculture

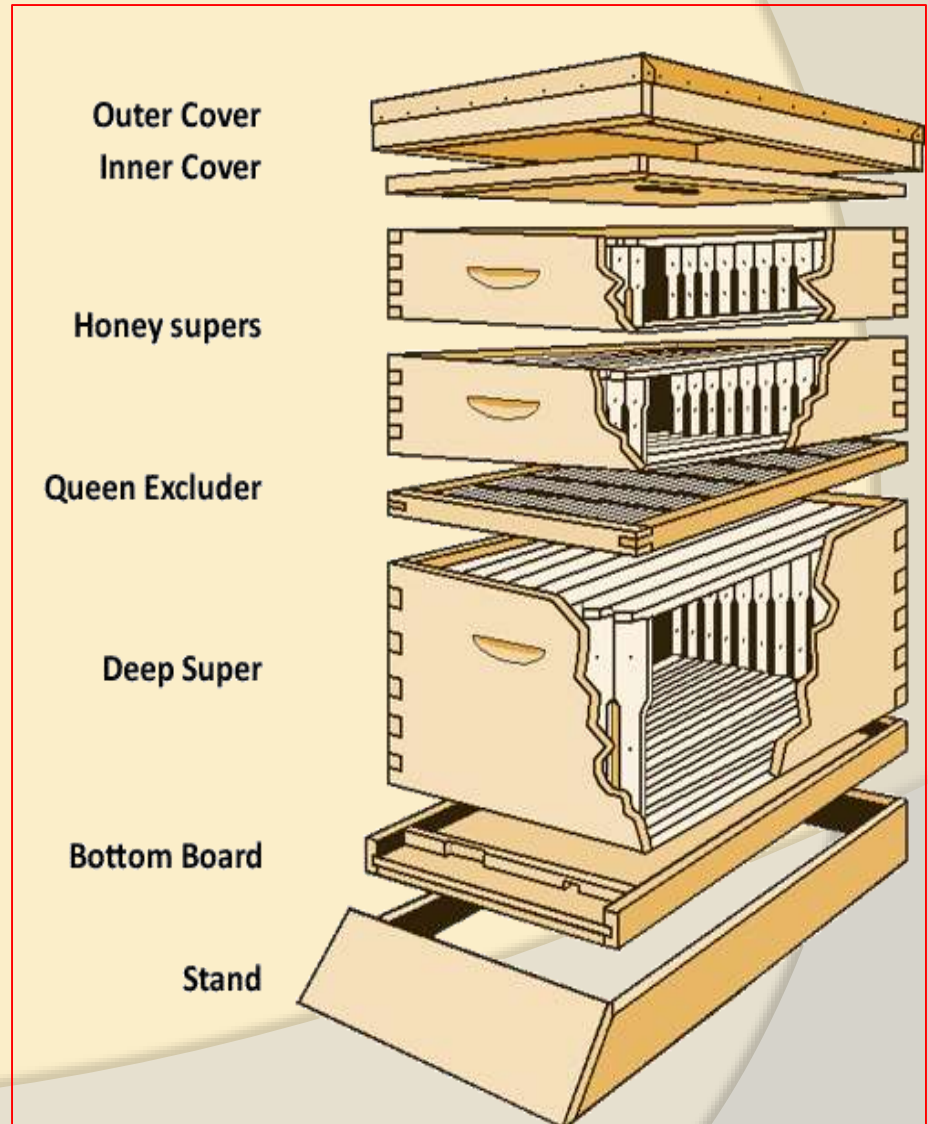
They are divided into 5 types:

- 1. Typical Movable Hive**
- 2. Queen Excluder**
- 3. Honey Extractor**
- 4. Uncapping Knife**
- 5. Other Equipments**

Typical moveable hive

○ It is a six type:

- (a) Stand
- (b) Bottom board
- (c) Brood chamber
- (d) Super
- (e) Inner cover
- (f) Top Cover

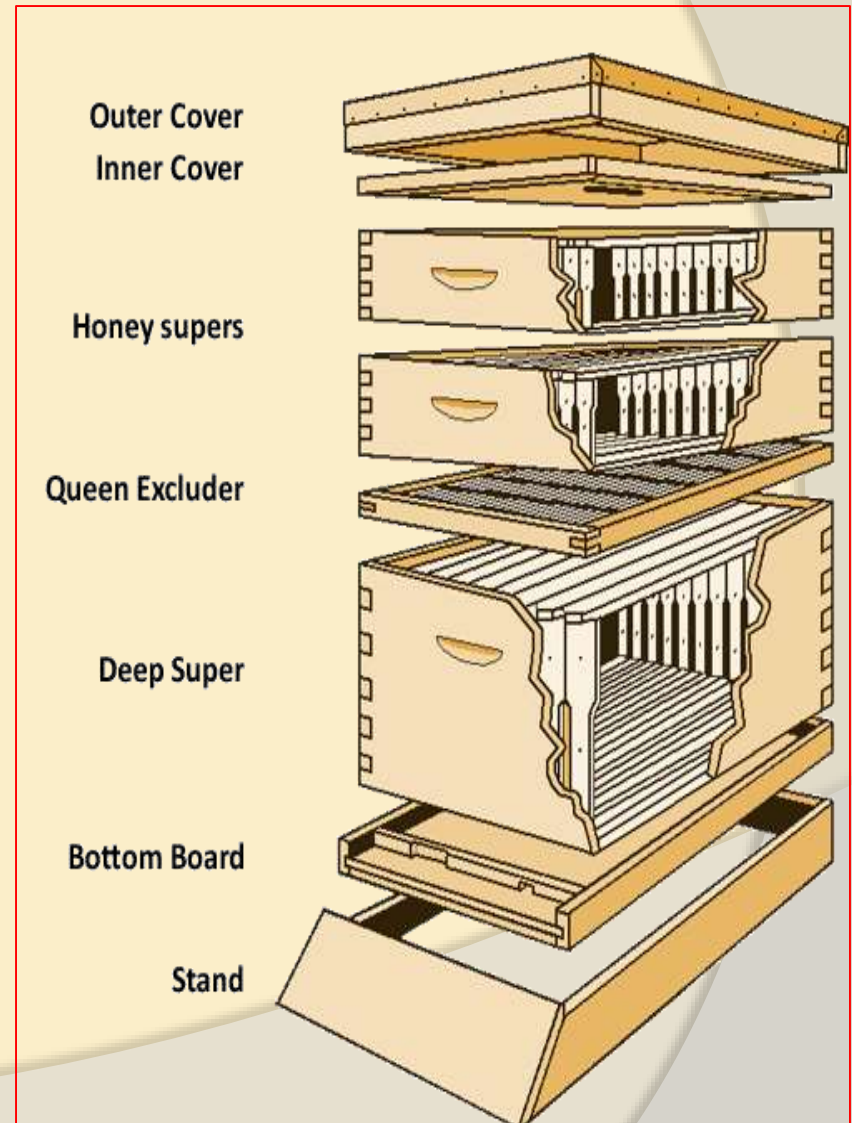


Typical moveable hive

- ◎ Size and number of frames are variable according to the need.
- ◎ The perforation size of zinc sheet is only 0.375 cm but the thorax of queen is 0.43 to 0.45cm so queen cannot pass through the pore.

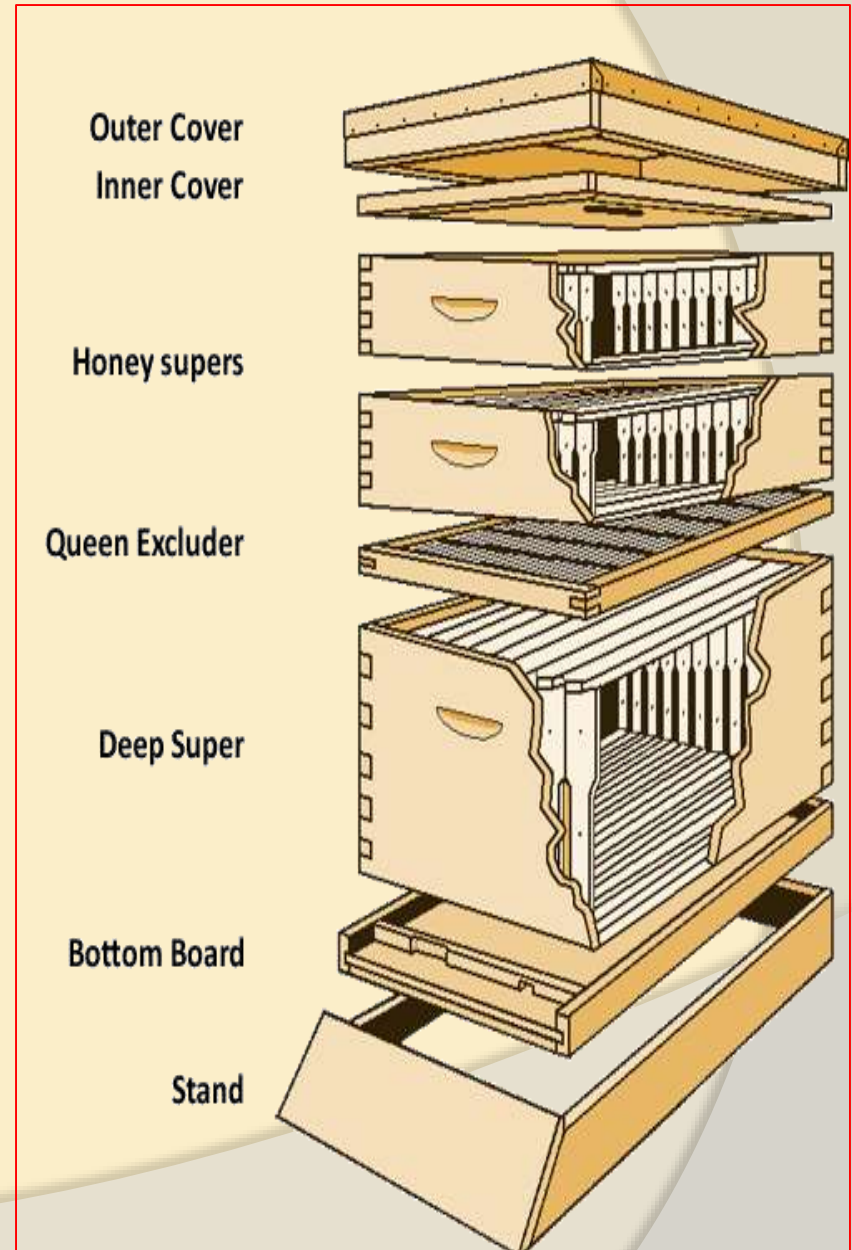
Parts of typical moveable hive

- ⦿ a) STAND: basal part of hive.
- ⦿ It is adjusted to make a slope so that rainwater comes down quickly.



b) **BOTTOM BOARD:**

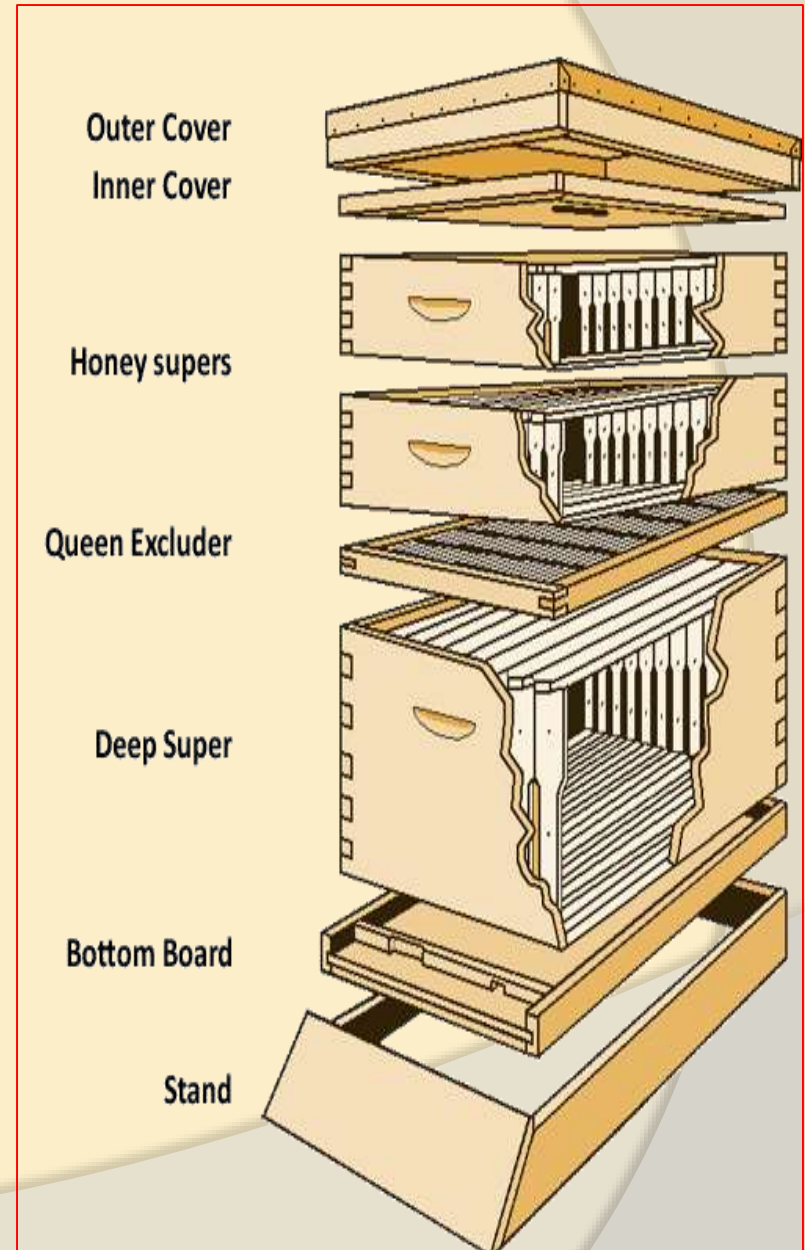
- Situated above the stand and forms the proper base. It has two gates one gate is for entrance and other is for exit.



c) **BROOD CHAMBER:**

Most important part provided with 5 to 10 frames.

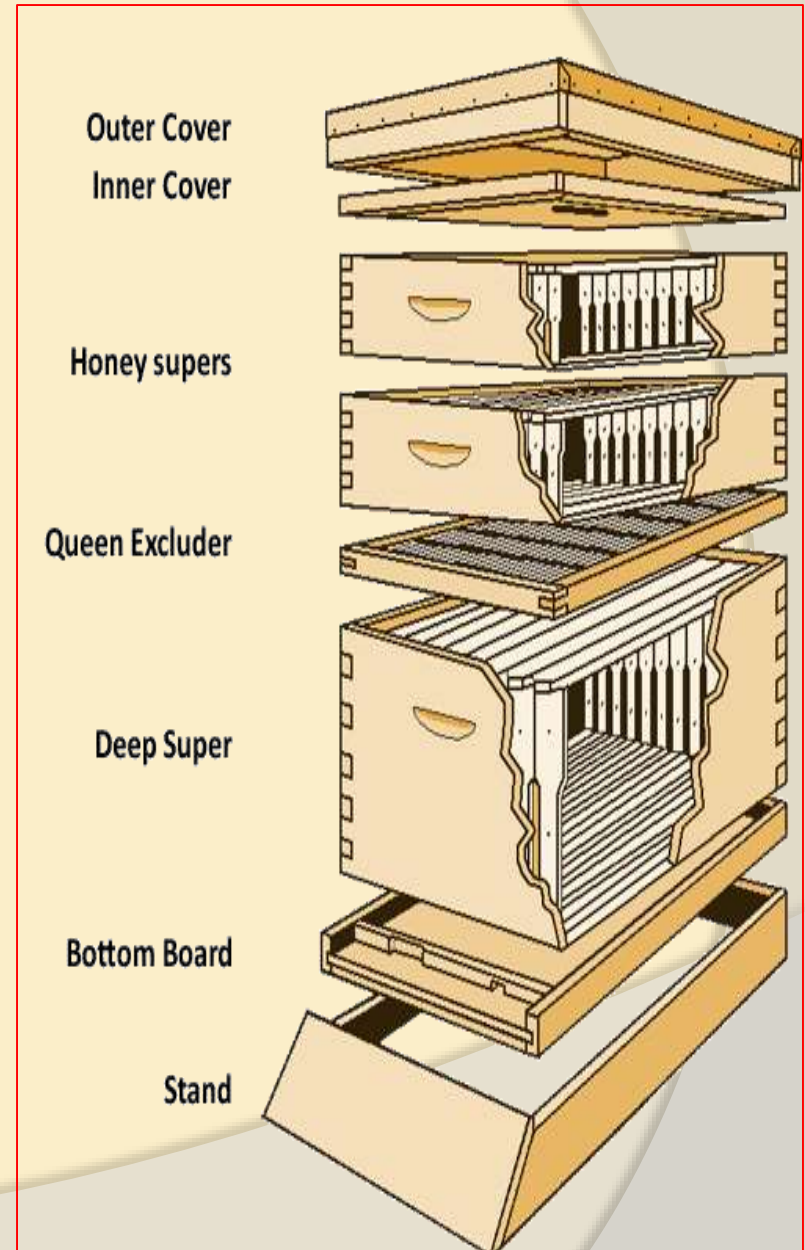
- In each frame a wax sheet is held at vertical position where bees start making walls and cells.



- ◎ Every sheet of wax is known as COMB FOUNDATION , which attracts the bees for the comb preparation on both the sides it helps in obtaining a regular strong worker brood cell come which can be used repeatedly

d) SUPER: It is without cover and the base.

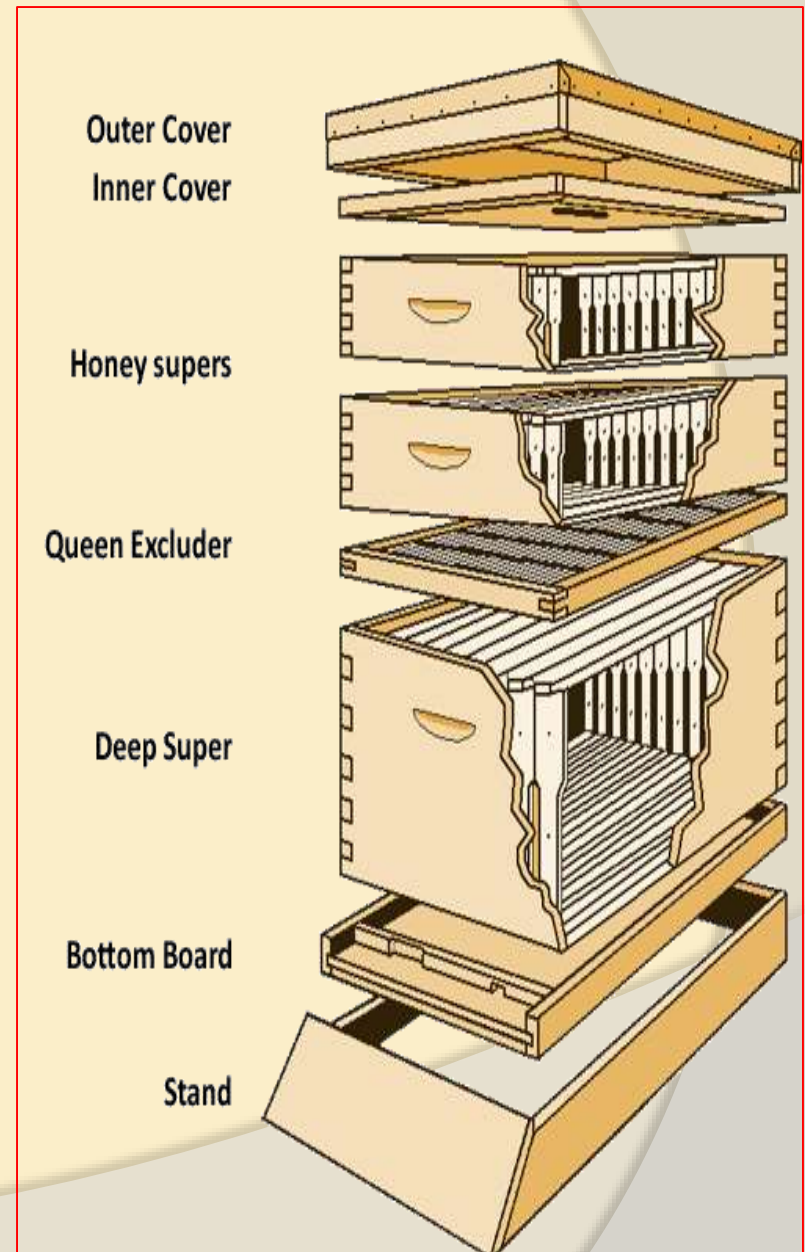
It is provided in many frames containing comb foundation to provide additional space for expansion of the hive.



e) **INNER COVER:**

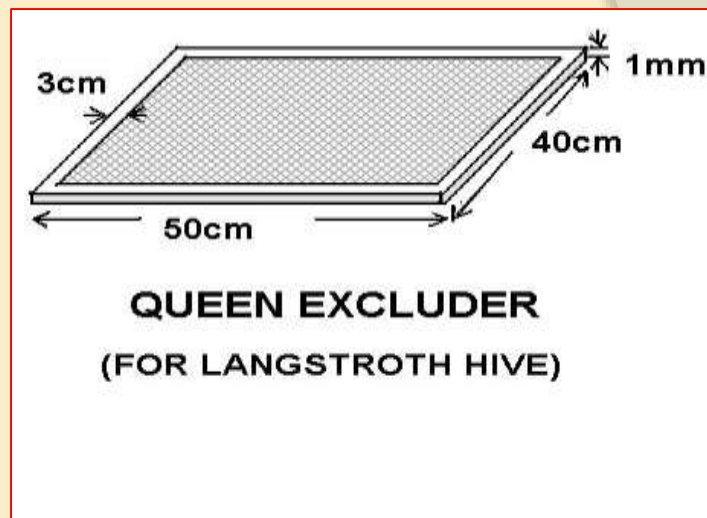
- ⦿ Wooden piece used for covering of the super, has many holes for proper ventilation.

f) **TOP COVER:** plain and sloping zinc sheet fitted on it protect the colony from rain.



2. QUEEN EXCLUDER

- Consists of wire gauze, extraneous guards and drone traps.
- Workers can pass through it but queen cannot.



3. HONEY EXTRACTOR:

- It functions on principle of centrifugal force.
- By centrifugation , pure honey is thrown out without any damage to the comb.



4. UNCAPPING KNIFE:

- Honey filled combs are sealed by wax which is removed by heated uncapping knife.



Electric Uncapping Knife

For uncapping all sizes of frames.

5. OTHER EQUIPMENT

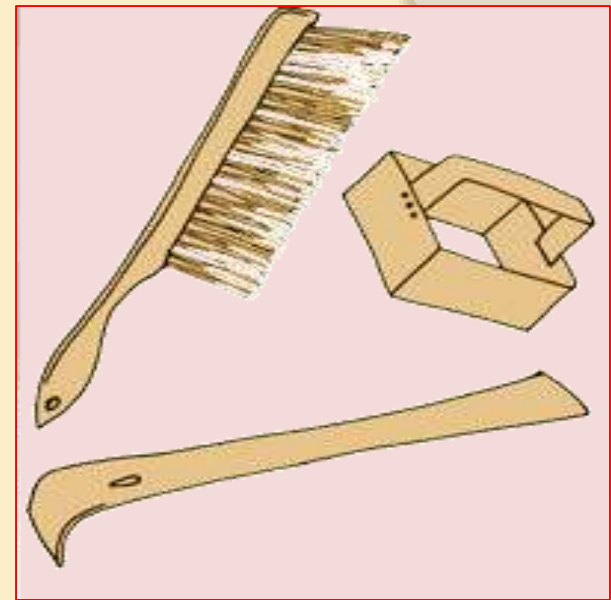
Beekeeping suits

Clothing is made from 100% cotton.
Available in sizes from S to XXXL.
Easy to wash (after detaching the hat, clothes are machine washable).

- Detachable hat
- Fully reinforced back mesh
- Very good visibility
- Double rings keep mesh away from face.
- Zipper around the body
- Very good zipper body
- Flat with velcro closures.
- Practical pockets adapted to the needs of the beekeeper.
- Rubber seals preventing the entry of bees under clothing

Size	Height	Weight	Waist	Length
S	184	60	78	170
M	178	68	85	175
L	178	84	94	180
XL	182	112	102	185
XXL	188	130	110	190
XXXL	188	138	118	195

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- Some materials like protective garments, gloves, net veil, bee net, brush etc are required for easy and well planned handling of bees.

Products of bee keeping

- ◎ HONEY: have very high nutritional value.



Production of honey

- Production of honey: It is a not direct plant product because the nectar, pollen and cane sugar bearing secretions of flowers are ingested by honey bees and get mixed with the saliva and undergo certain chemical changes due to enzyme action.

- ◎ Some ingredients are added to the mixture and reduce the water content .
- ◎ The whole mixture is collected in the honey sac until it reaches the hive.
- ◎ Honey is concentrated by a strong current of air produced by the rapid beating of worker's wings, crawling over the cells.

Chemical Composition of honey

- ⦿ Levulose: 38.9%
- ⦿ Dextrose: 21.3%
- ⦿ Maltose: 8.81%
- ⦿ Enzymes and pigments: 2.21%
- ⦿ Water: 17.2%
- ⦿ Ash: 0.2%

Storage of honey

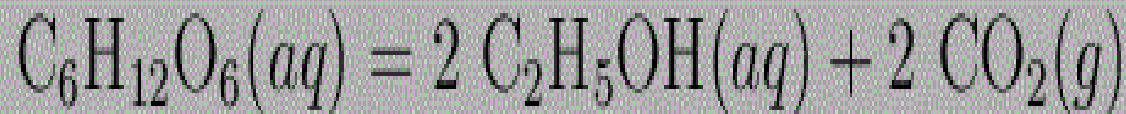
Consists of:

- 1) Granulation of honey: 10 parts of dextrose combine with 1 part of water and make crystals. Due to less solubility levulose is not crystallized and gives cloudy appearance.



Fermentation of honey:

- ⦿ Due to crystallization of dextrose 9% moisture is released which dilutes the remaining levulose of honey.
- ⦿ Yeast present in air, flowers and soils ferment the honey.



Economic importance of honey

⦿ **Food value:**

Used in the formation of candles cakes and bread.



Medicinal value: it is laxative, antiseptic and sedative and used in Ayurvedic and Unani medicinal systems.

Act as a curative of ulcers on tongue and alimentary canal.

Typhoid germs are killed by it.

Other uses: It is used as preservative, in brewing industry, in poultry and fishing industries. It is used to stimulate the growth of plants, the bacterial culture, in insect diet.

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