Beekeeping

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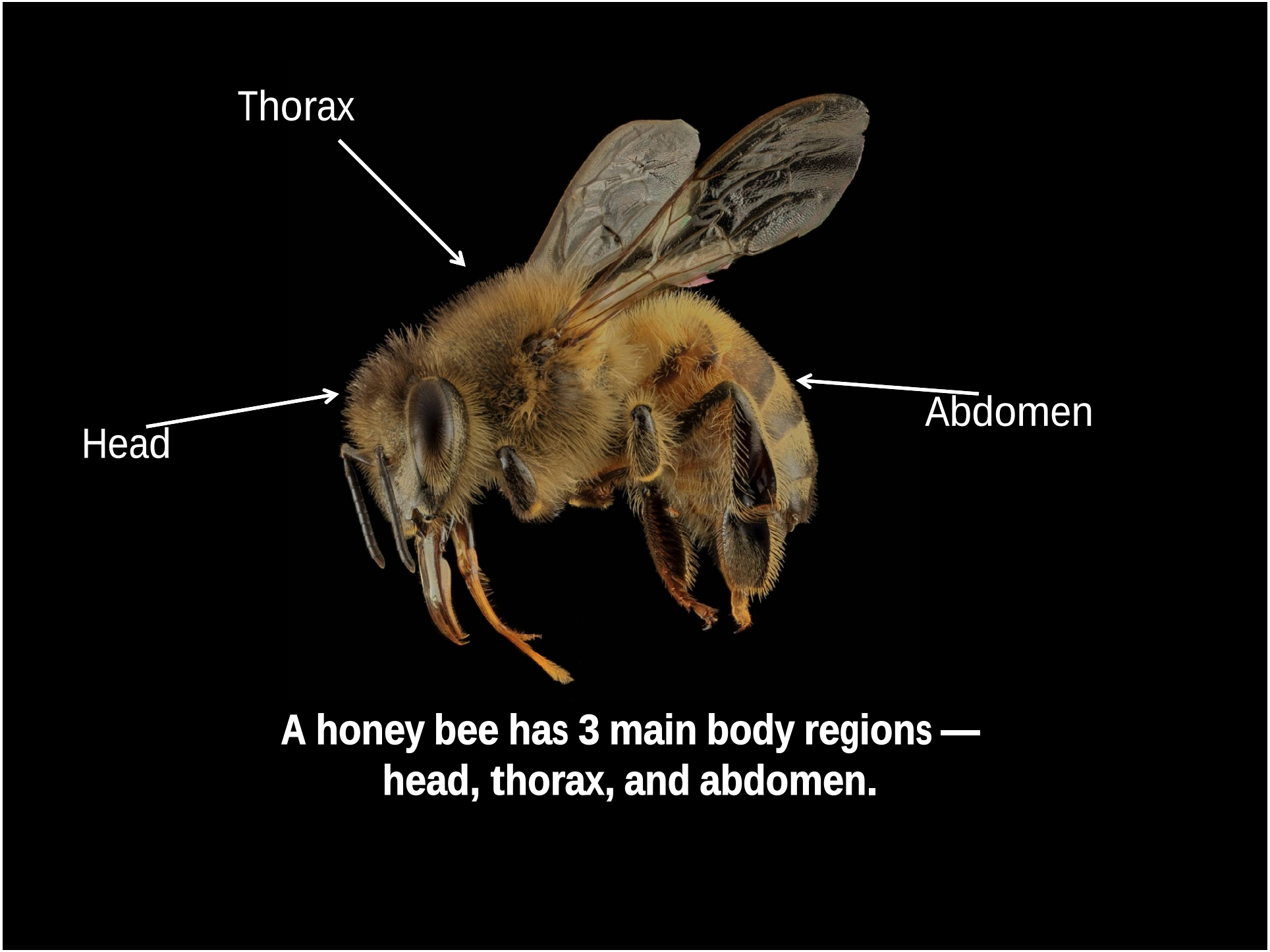
Benefits of Beekeeping

- **Bees help in cross pollination thus they increase the productivity of crops.**
- **Proper utilization of natural resources.**
- **Unemployed youth can start this business with minimal funds.**
- **It helps in rural development and promotes small village industry.**

Why Beekeeping ?



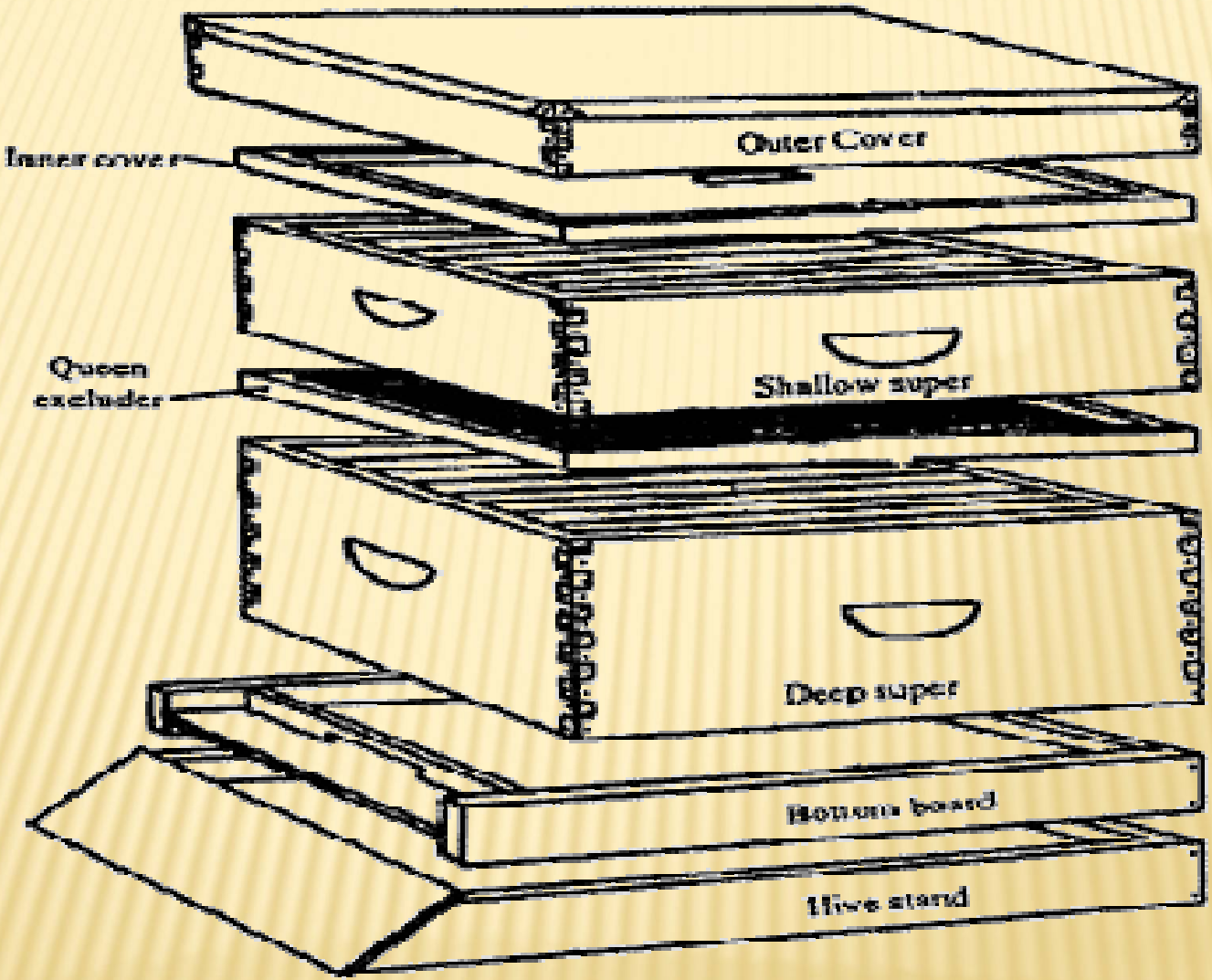
A honey bee has 3 main body regions — head, thorax, and abdomen.

The proboscis is a straw-like tongue used to suck nectar or honey.

A honey bee has 3 pairs of segmented legs used for walking, dusting their antennae, brushing pollen off body hairs, and storing pollen.

The hind legs of a worker bee contain a pollen basket–a collection of hairs where pollen is stored for transport.

Wax glands are located on the underside of the worker bee's abdomen. The glands form and excrete wax.



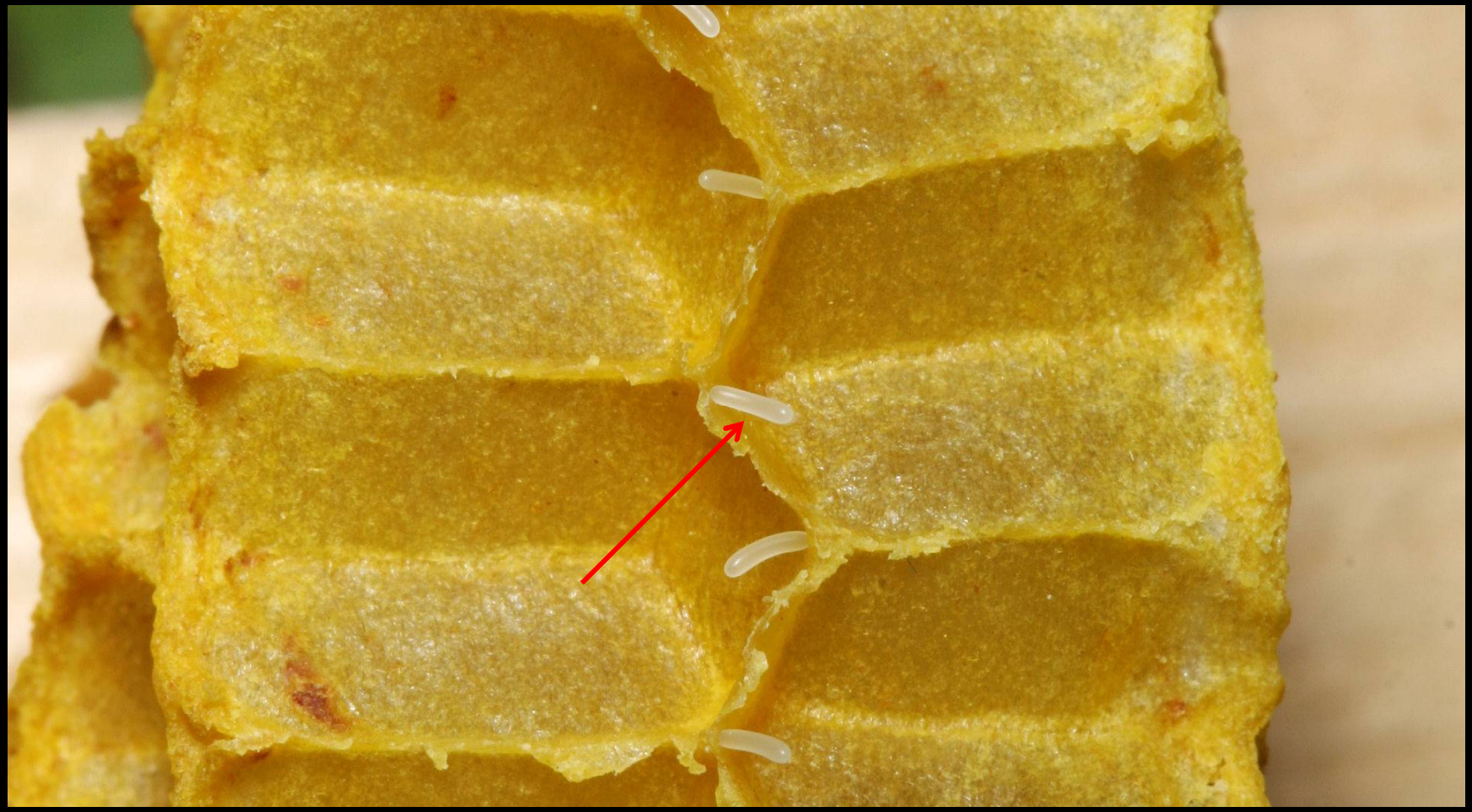
Elements of a beehive

Brood Chamber

Honey Bee Hive Form and Function

- Honey bee hives are made of wax which is formed in hexagon-shaped cells or units.
- Hive cells provide storage for honey, larvae, and pollen.
- An active bee hive serves as a giant nursery, a honey factory, and a well-protected home.
- Honey bee hives may be domesticated and managed by farmers in wooden boxes.

A honey bee has 4 distinct life stages — egg, larva, pupa, and adult.
The queen lays each egg into a different cell of the honeycomb.



After 3 days, the egg hatches, and a worm-like creature, called a larva, is formed.

Inside the cocoon, the larva transforms into a pupa, developing eyes, legs, and wings.

When the bee is fully grown, it chews its way out of the cell and emerges as an adult.

Caste System

An egg-laying machine

The queen is the largest bee. She is female. She lives about 3-5 years. There is generally only 1 queen in the hive.

Queen

Caste System

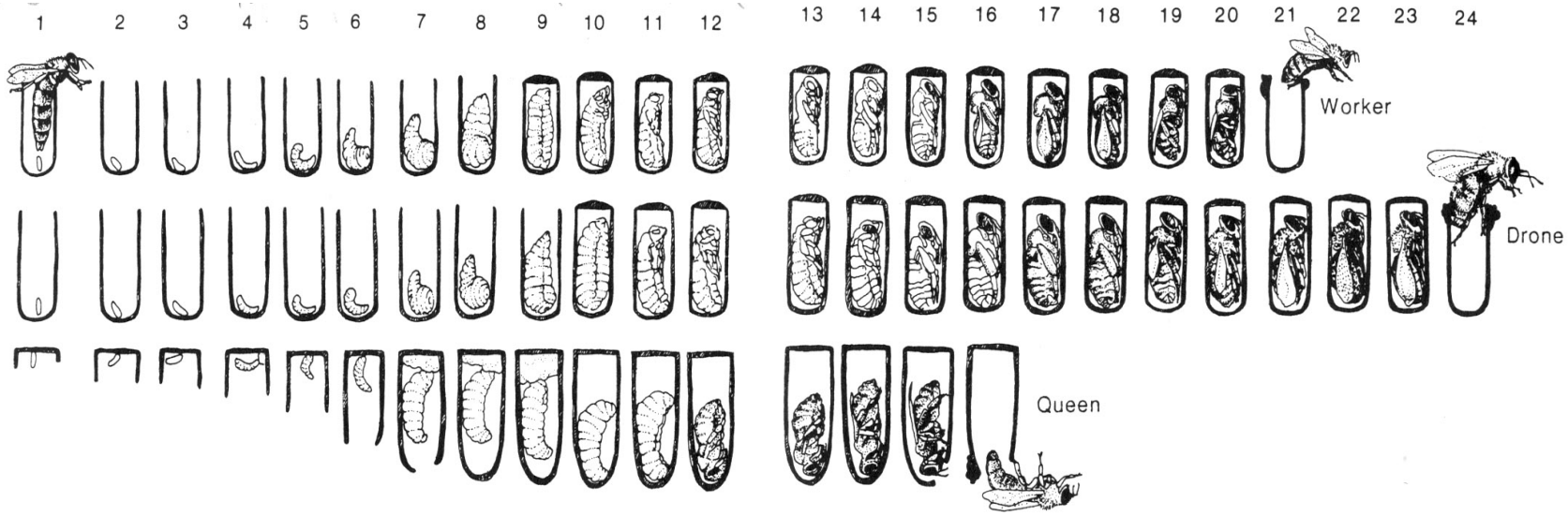
The workers are small, generally sterile female bees. A small hive may have 20,000 workers! They live at most Five to six months.

Workers

Caste System

The drone is a medium-sized bee. It is male. There are no drones in winter but a few hundred may be in the hive in summer. They live just the three months of summer at most.

Drones

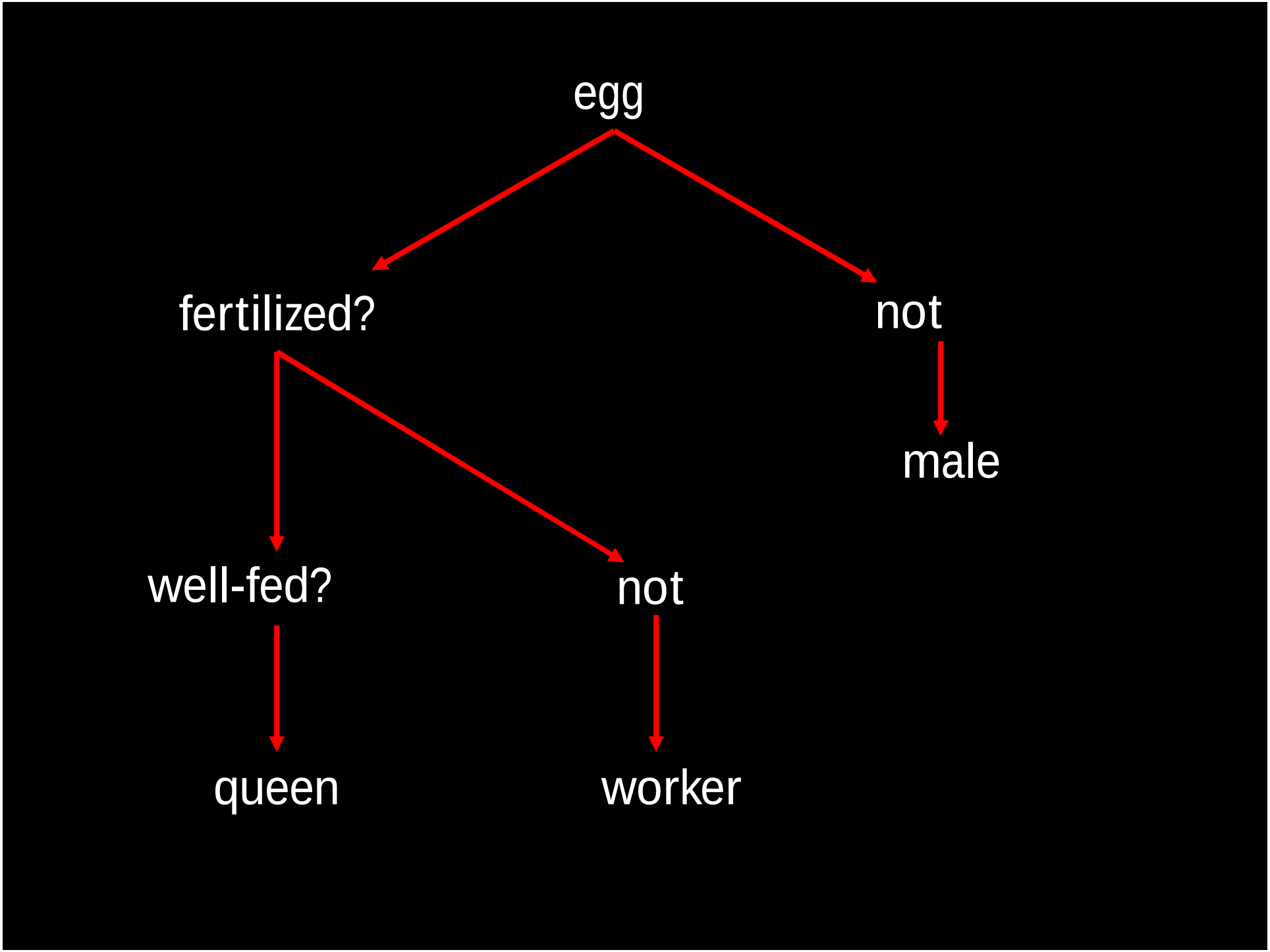


Complete metamorphosis, development times differ

Concepts of Queen Rearing

Bees rear queens because of one of four conditions:

- Emergency
  - There is suddenly no queen.
- Supersedure (Replacing of old queen)
  - The bees think the queen is failing/not egg laying.
- Reproductive Swarming
  - The bees decide there are resources and enough of the season left to cast a swarm without endangering the survival of the colony.
- Overcrowding Swarming
  - The bees decide that there are too many bees and not enough room or not enough stores to continue under the current conditions.


egg
fertilized?
not
male
well-fed?
not
queen
worker

Importance of Honey Bees (*Apis mellifera*)

- Fruits and vegetables require pollination to reproduce and the honey bee is one of the chief pollinators within an ecosystem.

Value of Honey Bee Pollination

Economics …

- Loss of colonies could seriously affect the production of several important crops that rely on pollination services provided by commercial beekeepers.

Potential causes of declining numbers of Honey Bees

Pesticides…

- Agriculturalists use chemicals on plant crops to deter or kill unwanted insects. Honey bees may come into contact with pesticides as they collect pollen from these sources and transport it back to the hive. Contamination of the hive would cause the bees to leave or die off.

Malnutrition...

- Mono-cropping is a process used by farmers who grow few products on a large scale.
- Domesticated honey bees are used as pollinators throughout the year for these few products.
- This pollination method does not provide honey bees with enough diversity in their diets to remain healthy resulting in sick and/or dying honey bees.

Potential causes associated with declining numbers of Honey Bees

Colony Migration

- Bee farmers often move colony hives to different locations. Rapid seasonal changes affect relocated honey bee colonies and confusion within the hive.

Potential causes associated with declining numbers of Honey Bees

Mites...

- **Varroa destructor mites** infect and feed on honey bee larvae in the brood cells.
- Mites infect the digestive tract of honey bees.

Varroa Life Cycle:

- Mated female mite enters cell 15-20 h before capping, hides in brood food
- When cell is capped, blood-feeding begins (HB's day 9-10)
- Cell eventually contains several (~5) mites; female plus offspring (one male offspring mates with sisters)
- When new bee emerges, mites can hitch a ride to new cells

- Varroa Prefer **Drone** (male) Cells
- In the fall, when drone-rearing naturally ceases, mites switch to worker larvae
- Late-season population crash and hive death often follows

Varroa control: Thymol strips

- Thymol strip (ApiLife-VAR, Apiguard); bees immediately move away
- SLOW: Only kills exposed mites, so must be in hive for 3-4 weeks (1 brood cycle)
- Can't be used when surplus honey supers are in place

Thanks.