

## BEEKEEPING GUIDE

### Introduction:

- Bees are insects that belong to order hymenoptera. There are over 20,000 species of bees (Apoidea) in the world. Most of these are solitary bees where each female makes her own nest and lays her eggs but does not usually live in it. A few bees are social; they live in a community known as a colony. Social bees make honey which is their food store.
- Bees that produce enough honey to make harvesting worth while belong to two subfamilies – honey bees (Apinae) and stingless bees (meliponinae).
- Apinae has only one genus – *Apis* – of which the species *Apis mellifera* is of much the greatest economic importance.
- The bee species believed to exist in Uganda are *Apis mellifera scutellata*, *Apis mellifera adansonii*, *Apis mellifera monticola* and several species of stingless bees (*Trigona sp*).

### The economic importance of Beekeeping.

1. Pollination of agricultural plants by bees. It is estimated that more than 75% of the crops in warmer countries benefit from bee pollination.
2. Improvement of economic condition of a farmer by providing additional income through the sale of bee products, namely honey, beeswax, propolis.



Honey, Beeswax and propolis

3. Honey is nutritious and provides a good diet.
4. Beeswax is valuable. It can be used to make candles, cosmetics, polishes, etc and be sold to obtain cash.
5. Beekeeping can create employment through establishment of small-scale industries i.e. honey and beeswax processing plants, candle making, polish manufacturing, making of crayons and hive construction.

6. Trade in bee products can lead to expansion of export base of a country and can earn foreign exchange, which is much needed especially in Uganda since it is a developing country.
7. Requirements for beekeeping equipment such as hives, smokers, protective clothing can stimulate business for local traders.
8. Beekeeping supports the environment through preservation of flora and fauna. The wetlands and game reserves can also be protected if people encroaching on them are encouraged to keep bees and leave the vegetation undisturbed.
9. Beekeeping can easily be integrated with crop farming. It does not compete with other agricultural activities. Beekeeping does not take valuable time as it can be done when time allows.
10. Women too can keep bees since hives can be suspended on two posts at waist level for easy manipulation and avoid hanging them up in trees. In some African cultures it is not ideal for women to climb trees. Perhaps this is one of the many reasons which had for long excluded women from keeping bees.
11. Beekeeping does not need valuable land as it can be done on less fertile land and wastelands.

### **APIARY MANAGEMENT**

An apiary is the location of beehives/bee colonies in hives.



An Apiary



Apiary management is the set of routine activities in an apiary depending on weather or seasonal changes and the initial objectives of set up. It is important for a beekeeper to know and use Good Agricultural Practices (GAPs) in his/her apiary for maximum yields and quality products. The beekeeper must put on protective clothing before going to the apiary and must carry a bee smoker.





Bee protective wear



Bee smoker

Beehives are hollow containers that can be closed and are purposely made to house bees, and these include:

a. **Traditional hives with fixed combs e.g. log hives and woven hives.**



### **Woven basket hive**

- They vary in shape, size and type of materials used; for example, they can be conical or cylindrical in shape. The cylindrical one measures approximately 90 cm in length and 30 cm in diameter
- Materials: papyrus, bamboo, fibre, twigs or sticks, cow dung or soil for smearing, grass or banana fibre or dry banana leaves as cover. Durability of the hive depends on the materials used and management.
- One end is completely closed while the other end bears 5-6 holes of diameter 8-10 mm in a row

### **Advantages woven basket hive**

- Cheap
- Materials are locally available
- Does not require a lot of skills and technology

- High propolis productivity.
- High wax productivity

**Disadvantages Woven basket hive**

- Difficult to inspect
- Combs break when transported over long distances
- Production is limited since hive cannot be extended
- Difficult to harvest and a lot of smoke is needed
- Difficult to determine harvesting capacity or volume because of differences in length and diameter.
- Swarming and absconding are common

**b. Top bar hives with movable combs e.g. Kenya Top Bar (KTB) hive.**

Top-bar hives are boxes with a series of bars arranged side by side along the top.



**Advantages Kenya Top Bar (KTB) hive**

- Colony splitting and multiplication easy.
- Control of swarming is possible.
- Easy to inspect to know the condition of the colony
- Harvesting is easy and possible to select sealed combed (ripe) honey
- Materials for construction are available
- Durable

**Disadvantages Kenya Top Bar (KTB) hive**

- It requires high skills and technology to manufacture
- Expensive for an ordinary person to afford
- Production is limited as it can not be expanded
- Combs can easily break while in transit

**c. Modern frame hives with movable combs e.g. Langstroth/ Dadant hives**

Frame hive is a box with movable frames



#### **Advantages of Langstroth/Dadant hives:**

- Transportable
- High honey yield
- Easy to inspect and harvest
- Easy to control swarming
- Bee breeding and queen rearing possible
- Long lasting

#### **Disadvantages of Langstroth/Dadant hives:**

- Very expensive
- Some of the materials for construction need to be imported
- Requires high skills and technology
- Production of other hive products is very minimal (wax and propolis, etc)

#### **Apiary siting**

A good apiary management starts with choosing a good site to hang or place hives. If you choose a poor site people and animals may be stung. If the site is insecure honey and hives can be stolen. The following are recommended practices for a good apiary site:

- The site must be easy to get to and from in order for you to check the hives regularly.
- An apiary can house up to 20 hives depending on the availability of flowering trees in the area as bees forage up to 3 km from the apiary.
- A high hedge or fence should be put around the apiary to separate the bees from people and animals, as bees can be defensive. The apiary should be away from human and livestock dwelling areas, roads and public areas.
- It should be safe from strong direct sunshine, direct wind and allow good air circulation be shaded during the hot part of the day but have sunshine in the morning. Shade must be constructed if none is available at the site.
- It must be near a fresh water supply; this can be a river, pond or even a dripping tap.
- It must be near food sources such as trees/nectar bearing crops, and cash crops that need pollination. Putting hives in a bee house/shed, which can be locked to prevent thieves stealing the honey, is one option. But there must be holes in the wall to allow the bees to get enough fresh air in and out of their hives.
- It is better if the apiary is away from areas where children play or any source of continual noise. Noise can disturb the bees and make them defensive.
- The apiary should be on higher ground, away from marsh or land liable to possible flooding. Humid conditions encourage fungal growth and prevent honey maturing and bees from foraging.
- The apiary must not be close to areas where pesticides are used as they may kill the bees and contaminate the honey

- The bees will also appreciate being away from smoke, fire and unfriendly neighbours.
- There should be good water not contaminated one.
- Should not be near the road.
- Should be near good plantation like coffee plantations.

#### **Hive Hanging**

- Hang hives using strong greased galvanized wires to protect the bees from pests.
- Hang hives in or under well-shaded trees
- Suspend hives from wires so that predators such as the honey badger cannot push them over.
- Remember always when hanging hives that it is important to allow for ease of harvesting. Honey quality is improved by careful harvesting which is easier when the hive is within easy and comfortable reach.
- Use trees or solid poles to hang the hive.
- The hives should be hung at waist height above the ground. This is important in modern beekeeping as the beekeeper wears a bee suit making climbing difficult. Traditional hives are usually hung in trees.

Alternatively a hive can be suspended on a rope with a pulley that can be lowered for harvesting.

#### **Hive Placing**

- Place hives on sturdy stands especially hives, which are not strong enough to hang.
- Place hives to allow you to approach the hives from behind.
- Placing hives on stands makes them accessible and easy to harvest and manage.
- Remember the stand should be sturdy and high enough for the hive to be at waist height.
- The legs of the stand must be placed in cans of used engine oil to prevent pests such as ants getting into the hive. Alternatively put bands of grease around the legs and spread ashes around the stand to discourage grass growth.
- The legs of the stand must be fitted with rat guards.

Alternatively hives can be put under a shelter or in a bee house. This can be a simple hut with holes in the walls for bees to get in and out. A bee house is useful because it can be locked to prevent thieves stealing the honey or the hives.

#### **Whichever method is chosen, it is always important to remember**

- To avoid very long straight rows of hives to reduce drifting and disease transmission.
- To cut the grass short around the hives.
- To remove small stones or debris in the apiary as the beekeeper may stumble over them.
- Positioning the apiary should comply with all conditions of beekeeping.

It often happens that bees do not enter the hive for quite a while. It is disturbing to see that the new hive that you have worked so hard to build stays empty and the empty hive does not produce any honey! There is therefore need to attract bees to the new empty hive.

#### **How to attract bees to the new empty hive**

- Keep the hives clean and pest free – no dirt, spiders, cobwebs or insects.
- Place hives along the swarming routes of bees.
- Use bee attractants or baits such as beeswax, propolis and lemon grass (wax the top bars for example).
- Use bait hives and catcher boxes to catch a swarm.
- Transfer bees from a fixed comb hive or from a wild nest.
- Divide an existing colony.
- Buy bees

#### **Catching a wild swarm of bees**



Swarming happens when the colony gets too big and the bees want to reproduce the colony by making a new queen. The old, experienced queen and most of the adult workers leave the hive with the swarm and fly out of the old hive looking for a new home. A new queen later hatch out and takes over the old colony and the remaining bees. The beekeeper can capture the swarm and place it into a temporary or permanent hive. The swarm has a better chance of staying into the new hive if it is captured during a nectar flow season.

### **Transferring bees into the hive**

It is possible to transfer bees from a wild nest or from a traditional hive with fixed combs in order to colonise the hive.

### **How to divide an existing colony**

Choose the strong, productive and less defensive colony to make divisions to increase your colonies. You can make a division of an existing healthy colony in order to colonize a new hive. Make division after the honey flow to increase colony numbers. The best time to divide a colony is when the bees are getting ready to swarm.

Avoid making divisions during the honey season because it will reduce the amount of honey to be produced. Between the beginning and the peak of the flowering seasons, strong colonies can suddenly become overcrowded with clusters of bees near the entrance, and large numbers of drones. To check if a colony is getting ready to swarm look for signs that the colony is overcrowded and the queen has run out of cells to lay eggs in. A colony can fill between 9 and 15 brood combs with brood of all stages, including a lot of drone brood and sometimes there is even little surplus honey. Also the bees will be producing queen cells.

Dividing controls swarming and saves the beekeeper from losing the bees or the trouble of catching a swarm. But always choose the most productive and less defensive colony. By dividing it you are spreading its good genetic characteristics. To divide a colony you must: -

- i. Prepare your new hive first – clean and rub it with some beeswax or propolis so that it smells familiar for the bees. Put it next to the overcrowded hive.
  - ii. Use your smoker and suit and keep your smoker alight nearby in case you need it.
  - iii. Choose a big healthy colony to divide and check it has brood, eggs, pollen and honey.
  - iv. Select a comb with queen cells, remove it from the hive and break all the queen cells except the biggest capped two. You need two just in case one gets damaged.
  - v. Now transfer the comb with the 2 queen cells into the new hive.
  - vi. Also transfer one or two other combs with a lot of sealed brood and a little unsealed brood. More brood means adult bees will emerge very quickly in the new hive.
  - vii. Also transfer one or two combs of food comb with lots of sealed honey and pollen.
  - viii. You can make a division with combs as long as the new colony has female worker eggs of less than three days old and larvae in the combs transferred. From the very young larvae they will be able to make new queen cells within a few days and raise a new queen.
  - ix. Include bees on all the combs you transfer and brush or shake in bees from 2 or 3 other combs as well.
  - x. Check very thoroughly that you DO NOT have the old queen on the combs you move or brush off. She must remain undisturbed in the old hive or mother colony. If you are in doubt then make sure you leave eggs and at least leave one big capped queen cell in the old hive in case you have taken her by accident. The bees will destroy the queen cell if the queen is present.
- Remember to put the brood combs in the middle and the honeycombs on either side to insulate the brood nest. The framing combs feed and help the bees to keep the brood warm. Where there is no honey supplementary feeding can be done.
- xi. These bees will become a new colony. Most of the adult bees will remain in the old hive and continue to make honey.
  - xii. The bees will look after the queen cells in the new colony and a new queen will hatch out. The first queen to hatch out will destroy the other queen cell.
  - xiii. Wait until dark then move the new hive to a site at least 2kms from the old site if possible.
  - xiv. If you don't have a place to put the new divided colony 2kms away then you must move both hives 1m either side of the old location. This will ensure that some returning bees go into the old hive and some into the new.
  - xv. You will need to feed the bees in the new hive, as they will not know where to go and get food in their new place. A small colony can become weak very quickly.
  - xvi. If you see the queen or brood after 4 weeks then this has now become an established colony.
  - xvii. If you observe bees collecting pollen after two weeks, this is an indication that a new queen has emerged in that hive.

### **Uniting colonies**

Beekeepers unite colonies in order to enlarge a colony, improve the yield of honey or control a worker-laying problem. A colony can produce surplus honey only if it is strong enough and contains 6-8 combs with plenty of brood and sealed honey and covered well by bees. This very much depends on the colony having a productive queen. If a colony fails to produce surplus honey for 2 seasons, or if it is weakened by repeated swarming, then it can be strengthened. Two weak colonies can be

combined to make one strong colony. One large colony collects more honey than 2 smaller colonies. A colony can be united with another colony or with a swarm. To unite a colony with another:-

- i. Remove and kill the queen from the weaker, most defensive or least productive colony.
- ii. Catch and cage the queen from the other colony in a matchbox and place the hive near to the old colony.
- iii. Smoke both hives thoroughly so that their familiar smells are covered.
- iv. To prevent bees fighting also dust them with flour or spray with sugar syrup – they will be busy cleaning themselves and will not fight
- v. Place the queen in her cage in the old hive next to the brood nest. The bees will chew the matchbox to release the queen.
- vi. Transfer all the top bars with combs and bees into the old hive. Alternate combs from the different colonies as you do so until all the brood combs are united and then add the honeycombs.
- vii. Close the hive and leave the united colony undisturbed for the next few days.

To unite a colony with a swarm you must: -

- i. Catch a swarm and if you can find the queen then cage her.
- ii. Open the hive and put the old queen (undesired queen) in a cage and kill her later.
- iii. Smoke the bees and place the new caged queen near the brood nest.
- iv. Shake the swarm into an empty part of the hive.
- v. If you did not find either queen then do not worry. Leave both queens in the hive and the stronger one will kill the weaker one.

Note: In the process of uniting colonies, you may experience swarming or abscondment.

As the new colony has eggs and larvae in the combs they need to be protected. While uniting the colonies the queen should not be kept away for more than 1 hour.

### **Hive Inspection**

Once the hive is occupied and the bees are busy, it is said to be colonized and it is important to inspect the colony to monitor its performance. Observe the following simple guidelines while carrying out inspection:

- i. Do not stand in the flight path of the bees.
- ii. Work gently without excessive talking or banging noises.
- iii. Puff smoke gently around the entrance of the hive and remove the lid carefully.
- iv. Remove a few empty bars to create a gap at one end of the hive. This should not disturb the bees. Thereafter, remove one bar at a time. Smoke the gap gently and hold the bar vertically so as not to break off the comb.
- v. Use a hive tool or knife to separate bars that are glued together by propolis.
- vi. Keep the bars in the same order and try not to squash any bees when replacing them in the hive. Squashed bees release a smell (alarm pheromone) that sets other bees on the attack.
- vii. Do not visit the hive in the warm part of the day-about six o'clock in the evening is a good time.
- viii. Do not try and work with too many hives at a time, at least not more than 45 minutes in an apiary as bees from the first hive worked on will become agitated and attack, leading to further commotion amongst all the bees.
- ix. Always wear light coloured clothes. Ideally, protective clothing should be worn, especially a veil to protect the eyes and face.
- x. Make sure the top bars are pushed together as they are replaced, so that no gap exists. Finally, gently replace the lid on the hive.
- xi. Always keep the grass cut and the area around the hives tidy.
- xii. Always extinguish the smoker if not in use.

### **Note the following during inspection**

1. Check on the strength of the colony by observing the brood: eggs, larvae and pupae.
2. Is the queen present? If she is hiding, the newly laid eggs can prove that she is present.
3. Is the queen prolific-laying enough eggs?
4. Is the colony healthy? Check on any indication of bee diseases.
5. Check on food stores (honey and pollen).



6. Is honey ready for harvesting? Indication is the capping of the honey cells. The comb should be capped/sealed on both sides.
7. Is the room enough for the bees? If not, remove some of the brood combs and unite with a weaker colony and replace with empty bars.
8. Are there indications of swarming? This is when they construct many queen cells or drone cells. Destroy some and provide more room (as long as the queen is present).

It is recommended to keep simple but accurate record of each hive. To monitor the development in the colony, it is very useful to take notes in a notebook. After inspection, you should make note of what you have found in the colony and any adjustment you have made. For example, note the size or strength of the bee colony, the number of harvested combs etc. In summary, keep notes on the following:

- Date of inspection
- Colony strength, i.e. number of brood combs, is there nectar, pollen, honey etc.
- Characteristics of the colony, calm, defensive, very defensive (sometimes some colonies can be so defensive that no inspection maybe carried out on that day).

### **Record keeping**

Good records kept by the beekeeper will help him/her to follow the general progress of his/her operations. Two records are particularly important: colony and operational records.

### **Why should we keep records?**

- ❖ It is a good idea to keep records during each hive inspection so that you can follow the progress of each colony and monitor their condition. But bear in mind that each inspection should have some purpose and routine examinations should be planned.
- ❖ Records can be kept so that you know what was done last time and what to do next time and what equipment you might need.
- ❖ Keeping records allows us to identify where we have made mistakes in colony handling.
- ❖ Management records are for the beekeeper's individual benefit. Some people like to keep records of all their financial outgoings. From these they can work out when they might recuperate their costs from the sale of the honey or work out how much profit they will get.
- ❖ Most of us can remember what is going on if we have one colony but what about 5 or 10?
- ❖ All the data collected is useful when the number of colonies has grown considerably and you want to start selecting the best ones.
- ❖ You need records to have any chance of success in selecting good queens to breed or in rearing queens.

### **Types of records**

#### **a) Colony Records Note the following.**

Date/time of last inspection, forage and weather conditions, Date of occupation/colonization, Age of queen, Date of last harvest, Honey yield per hive., Colony strength and growth rate (number of combs containing brood), Timely manipulation (swarm prevention, feeding), Amount of honey/stores in hive, Characteristics of hive (defensive, calm, productive, poor), Swarming record – how often, when and why., Pests and diseases., Hives name and number, Type of hive, Remarks.

#### **b) Operational Records Note the following**

Visits to the apiary site, Cash flow – how much money spent or earned, Purchases, Labour, Transport costs, Servicing of equipment, Other expenses and income  
How to keep records

- ❖ A simple table can be drawn in a hard-covered book and stored at home. Alternatively, you can write the information on card and attach it to the underside of the cover of the hive (not inside the hive or the bees will chew it up).
- ❖ The column headings will vary according to what you think is essential. Most things can be recorded in the comments column.
- ❖ For administrative purposes it is useful to number the hives.
- ❖ The record should be read before opening the colony.
- ❖ They should be filled out with essential information immediately after every hive inspection.
- ❖ Records should be brief.

- ❖ You will develop your own method of recording information. With practice the writing of records will soon become an integrated part of every inspection.
- ❖ A cash flow record and other operational records should be separate record from the hive/colony record.

## BEE PESTS AND DISEASES

### *Bee pests:*

*Wax moth, Ants including safari ants, Honey badgers, Hawk moths, Man, Cattle, Baboons, Termites, Hive beetles, Birds, Wasps and hornets, Louse, Spiders, Lizards, Mice, Robber bees, Pesticides, Cleptoparasitic drone flies (flies that look like bees), Mould and fungus, Varroa Mite) Tropaelaelaps Mite), Acarine (tracheal) Mite)*

**Man:** People can cause a lot of damage to hives and are usually considered the worst enemy of bees.

Always try and keep your hives where they can be supervised. Hives must be maintained and protected against weather, natural enemies and fires. Hives can be placed in a bee house or a strong fence placed around the apiary.

**Wax Moth (greater and lesser):** This moth looks like the moth that eats grain and destroys woolen clothes. It lays eggs in the hive and the larvae looks like a worm or maggot. Both the larvae and adult feed on the combs. The greater moth's larvae feed on the brown combs and destroy the wax. It burrows through the combs and leaves a white web or mesh in a long line in the comb. The lesser moth tends to attack processed wax so always use clean wax on starter strips. Scrape away any eggs, wax moth faeces or pupa. Kill any larvae or adult wax moths. Plug any holes and cracks in the top bars and the hive body. Remove old combs during times of food scarcity when the colony size shrinks. Keep the hive clean and free from bits of comb and debris. Wax moth can be controlled by a strong colony. Unite weak colonies with stronger ones.

**Safari & other ants:** Ants go for bees, brood and honey during the rainy season or when the hives smell of honey. Hang hives and grease hanging wires regularly. If hives are on stands, place the legs of the stands in tins of old engine oil. Alternatively tie rags soaked in diesel around the supports or smear the posts with a ring of grease or creosote. Clear the ground under the hive stand and spread dry ashes around the posts– the ants will not walk on the ashes. Keep the grass short and stop the branches from touching the hives. Make hive parts fit together without gaps. Also keep the hive bottom clean and be careful not to spill honey or sugar water when feeding.

**Termites:** Termites will not attack the bees themselves but will destroy your hives and equipment. Suspend hives between trees instead of poles. Alternatively treat the posts with used engine oil and place the supports in tins of old oil. Also avoid using unburnt bricks as hive supports.

**Hive beetles (large and small):** Beetles may enter through gaps and cracks but also through large entrance holes. The large black beetle feeds on brood and is most numerous during the rains. Others with distinct markings feed on small amounts of honey and pollen. The smaller hive beetles lay eggs in pollen cells, which can be turned into a stinking mess by the maggots within a few days. To prevent the beetle use holes instead of slits for the entrance and reduce the size of the entrance holes. Hand pick or destroy them if found in hive.

**Honey Badger or horr:** The honey badger can break into hives to eat honey and brood. Hang the hives securely 1.5 metres from the ground to prevent the badger knocking them down. As well as suspending hives, tie lids on securely with wire and put heavy stones on the covers, to prevent the badger breaking them open. Alternatively use a pulley system and suspend hives over 2 meters from the ground by means of a rope.

**Pirate Wasp** or 'Shini Lebox' (lion of the honeybee): These are slender wasps, yellow-brown with black cross stripes. They will molest colonies, attack and eat worker bees. Fill any gaps and holes in the hive and make the entrance small enough for the bees to defend. Cut a bottle with a narrow mouth in half and invert the top, put some water and jam in, the wasps will enter and drown (do not bait with honey).

**Mould:** This is a fungus that grows on the inside of the hive and is caused by excess moisture. Mould may indicate that the hive is sited in an inappropriate damp place. This is a problem mainly during and shortly after the rains but is generally not a major problem.

. Remove any unattended empty combs from the edges of the nest if bees fail to fan any surplus moisture out of the hive. Increase the number of entrance holes to improve hive ventilation and air passage.

**Birds, such as honey guides and bee eaters:** Don't leave any brood combs exposed and scare the birds away. Alternatively place your hives in a bee house.

**Bee Louse:** This is a small light brown insect with 6 legs (3 pairs). It is seen on the backs of the bee but causes negligible damage to the colony.

**Varroa mite:** This is a flat, reddish brown mite and is a relative of the spider with 8 legs (4 pairs). It is similar to the bee louse but smaller. This mite feeds on the bee's blood, making the bee weaker and weaker. It is found on the developing drone bee pupae and emerges with the adult bee. Although this is **not** found in Uganda at the moment varroa is found in Yemen. Varroa slowly kills the colony and is a most devastating disease for Apis Mellifera bees throughout Europe,

North America and elsewhere. It should not be confused with the bee louse. This is a parasitic mite causing wide spread damage worldwide. Uganda beekeepers should be on the lookout for varroa as it is an extremely serious pest. **Know the difference between bee louse and varroa Do not import bees to avoid the spread of varroa and other pests**

**Acarine mites** – These live in the breathing tubes of the bees and prevent breathing.

**Tropilealaps** – These are smaller than varroa but also feed on the bee's blood.

**Geckos and cockroaches** sitting under the lids of hives are usually no threat and can even help to control intruders.

Unoccupied hives often attract **squirrels, mice, dormice and lizards**. The smell of their droppings will discourage swarms from occupying the hive and may even damage it. Protect unoccupied hives against pests and keep them clean and baited.

**Bee diseases:**

- *American Foul Brood, Sacbrood, Nosema, Paralysis* Brood diseases affect the developing brood. A beekeeper must always check the brood for abnormalities. Larvae should be fat, shiny and white and the sealed brood should be even.

**Chalkbrood:** A fungus infecting and killing larvae that then dries and shrinks to a chalk like mummy. The house bees expose and then remove these mummies. Only occasionally does the disease affect so many larvae that the mummies are seen. It weakens but does not usually kill the colony. Remove the infected combs, control the disease and keep stresses on the colony (insecticides, pests, etc.) to a minimum. Unite the colony with a stronger one. This disease is found in Uganda.

**European Foul Brood:** This bacterium affects the unsealed brood. It causes larvae to die and seem to 'melt down' in the cells. They turn brown and cause a sour smell in the hive. Combs are removed and new combs are added from unaffected colonies. The queen is caged for a few days so workers can remove diseased larvae and then released.

**American Foul Brood** This bacterium causes bees to die in the larvae or pupa stage. It is very serious and very contagious. Cappings are indented, the sealed brood becomes sunken and it looks like there is glue in the cells. The brood nest becomes irregular and there is a smell of glue in the hive. All bees and top bars must be burnt and the hive scorched and washed. Do not feed honey or exchange top bars and combs. Remember do not import bees into Uganda.

**Sacbrood** This disease affects brood at the pre pupae stage. The sealed brood will have lots of holes and pupae may be unsealed. The pupae will be found dead, pointed and underdeveloped. It is similar to European Foul Brood but without smell.

If you suspect that you have a brood disease you should:

- *Remove and destroy all the affected brood combs.*
- *Cage the queen for 7 days to stop the disease cycle*
- *Feed the bees each day.*
- *Use a queen gate after releasing the queen to prevent absconding.*
- Never exchange combs and top bars between hives.

Other diseases affect the adult bee. These are easier to detect, as you will find dead bees in and outside of the hive.

**Nosema** This is a disease of adult bees that causes poor brood nest development and is often accompanied by diarrhea. You will often see yellow diarrhea outside and at the entrance of the hive. It has to be detected by microscope and treated with medicines.

**Paralysis** A virus that causes death. The bees shake when they are born and cannot fly. Sometimes infected bees exhibit no specific signs and specialist techniques are needed to identify it.

**Black Queen Virus (BQV) disease** (reported in Kabarole and Mbarara). It mostly affects housed apiaries and those in dump places. Prevention of BQV is by removing the bee colony from the apiary and remove the dead bee.

**Insecticides and pesticides:** Pesticides poison bees. A colony can die within 3 hours of exposure to insecticides as they quickly pass it in the nectar to other bees and brood in the hive. A bee spinning on the ground outside the hive is a sign of insecticide poisoning. Also bees often die with their tongues sticking out.

Keep in touch with other farmers and know when they are spraying. Ask them to spray at night when the bees are not flying. When spraying is taking place close your colonies using mesh wire to allow ventilation. *NEVER totally block up the holes or the bees may die of suffocation!* Feed the bees with sugar water whilst they are enclosed. Research and suggest alternative less toxic alternatives, *such as tobacco in soap powder or neem leaves crushed in water.* As a last resort move the hives from the area either temporarily or permanently.

We must always be on the lookout for diseases as they can spread quickly and may adversely affect bee keeping in the area.

*The apiary should be kept clean as a general control strategy for most pests and diseases.*

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