APICULTURE AND AQUACULTURE WEEK 6: BEE HEALTH – DISEASE AND PEST MANAGEMENT. COMMON BEE DISEASES: IDENTIFICATION AND CONTROL

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Importance of keeping a healthy honey bee population

- **Biodiversity Conservation:** Healthy honey bee populations help maintain the balance of various plant species in natural habitats, such as forests and meadows.

- **Production of Honey:** A healthy bee population produces high-quality honey (Requir, 2019).

- **Wax Production for Industrial Use:** Beeswax, a product of healthy bee colonies, is used in industries to make candles, cosmetics, and polishes

Importance of keeping a healthy honey bee population continues …..

- **Source of Royal Jelly, Propolis, and Bee Pollen:** Healthy bees produce royal jelly, propolis, and pollen, which are used in pharmaceuticals and natural health products.

- **Support of Food Security:** Healthy bees ensure better crop yields, helping to improve food security in both small-scale and commercial farming settings.

- **Economic Benefits for Farmers:** Maintaining healthy honey bee populations supports the livelihoods of beekeepers and farmers.

Importance of keeping a healthy honey bee population continues …..

- **8. Environmental Monitoring and Indicator of Ecosystem Health:** Honey bees act as bio-indicators of environmental health. Monitoring healthy bee populations helps detect early signs of ecosystem imbalance.
- **9. Pollination of Native Plants:** Healthy bee populations ensure the regeneration of these native plants.
- **10. Education and Research Opportunities:** Maintaining a healthy bee population provides for research.

The principal of prevention in bee health management

- In bee health management, all efforts are geared towards prevention of diseases and pest outbreaks in apiaries (Morawetz et al., 20219)

Methods of preventing pests and Diseases in an apiary

a) Sanitation

- Tools should be sterilized with flame and scrubbed with isopropyl alcohol after working in or

inspecting a hive.

- Clothing and gloves that are exposed to a hive where disease is suspected needs to be scrubbed and disinfected with 10% bleach solution or disposed.
- If not using gloves, rinse hands with rubbing alcohol then scrub with soap and water after working in a hive that appears to have been infected with disease.
- When disease is suspected, practice the previously mentioned steps.

Methods of preventing pests and Diseases in an apiary continue ..

b) Cultural Controls

- When purchasing a bee colony, find out if the seller has been treating with antibiotics for pathogens. Treated colonies could already be infected with disease, even in the absence of symptoms.

- Never switch frames from a box that is suspected to have pests and pathogens to a box without such problems.

- Do not purchase or accept used frames, boxes, or other beekeeping equipment that have not been inspected and certified by your county's bee inspector.

Methods of preventing pests and Diseases in an apiary continue ..

- Boxes infected with American Foulbrood should be marked with the letters “AFB” followed by the year to prevent unintentional contamination.

- Equipment that has been infected with American Foulbrood must be treated or burned and buried.

- Do not leave unused beekeeping equipment in a bee yard. Idle equipment should be destroyed or stored in an area where bees cannot access.

Methods of preventing pests and Diseases in an apiary continue ..

c) Mechanical Controls

- Plug holes and crevices in boxes to prevent arthropod pests from entering colonies.

- Use a screened bottom board to reduce the population of varroa mites.

- Consider drone brood trapping to control or prevent severe varroa mite infestations.

Methods of preventing pests and Diseases in an apiary continue ..

d) Genetic Controls:

- Purchase stock that is resistant to varroa mites and other pests and diseases.

Methods of preventing pests and Diseases in an apiary continue ..

e) Monitor Colony Health

- Check brood comb for symptoms of American Foulbrood on a regular basis.

- Monitor varroa mite presence using a sticky screen, ether roll, or powdered sugar roll.

- Know the economic action thresholds for honeybee pests.

Methods of preventing pests and Diseases in an apiary continue ..

f) Community Resources

- Join a local beekeeping club to learn about pest outbreaks in your area.

- Report abandoned apiary equipment and all suspected cases of bee diseases.

Common pests affecting honey bees in Uganda

(i) Ants

- **Description**: Ants are common pests that invade beehives in search of honey, pollen, or brood. They can disrupt the hive, steal resources, and weaken the bee colony.

- **Impact**: Ant infestations stress bees, reduce productivity, and may lead to colony abandonment.

- **Control**: Applying barriers such as grease or oil around hive stands, elevating hives, and maintaining a clean hive area.

Common pests affecting honey bees in Uganda

(ii) Wax Moths

- **Description**: Wax moths (e.g., the Greater and Lesser Wax Moths) lay eggs in hives, and their larvae tunnel through combs, feeding on beeswax, pollen, and bee larvae.
- **Impact**: Severe damage to comb structures, especially in weak colonies, leading to colony collapse.
- **Control**: Strong colony management, proper storage of unused combs, and use of moth traps.

Common pests affecting honey bees in Uganda

(iii) Bee Lice (*Braula coeca*)

- **Description**: Bee lice are tiny wingless insects that live on adult bees, feeding on nectar and royal jelly.

- **Impact**: Though not highly destructive, large infestations can stress bees and reduce honey production.

- **Control**: Maintaining strong colonies, and using manual removal or natural treatments.

Common pests affecting honey bees in Uganda continue …

(iv) Small Hive Beetles (*Aethina tumida*)

- **Description**: These beetles lay eggs in hives, and their larvae feed on honey, pollen, and brood. They also defecate in honey, causing it to ferment (Jones, 2020).
- **Impact**: Infestations can lead to hive destruction, honey spoilage, and colony collapse.
- **Control**: Trapping beetles, removing infected combs, and keeping strong, healthy colonies.

Common pests affecting honey bees in Uganda continue ….

(v) Spiders

- **Description**: Spiders can build webs near hive entrances and catch foraging bees, causing bee mortality.

- **Impact**: While spiders typically don’t directly harm colonies, they can reduce forager numbers and stress bees.

- **Control**: Regularly cleaning the hive area and removing webs to prevent predation.

Common pests affecting honey bees in Uganda

(vi) Birds

- **Description**: Certain bird species, such as bee-eaters, prey on honey bees during flight. They can gather near hives, reducing the number of foraging bees.

- **Impact**: Significant loss of worker bees, weakening colony foraging ability and productivity.

- **Control**: Placing scare devices around apiaries or using netting to protect bees from predatory birds.

Common pests affecting honey bees in Uganda continue ….

(vii) Honey Badgers

- **Description**: Honey badgers are notorious for raiding beehives to feed on honey, larvae, and bees. They can tear apart hives and destroy colonies.

Impact: Severe hive damage and loss of bees, brood, and honey.

- **Control**: Elevating hives on strong, sturdy stands or using electric fencing to keep honey badgers away.

Common diseases of honey bees in Uganda

1. American Foulbrood (AFB)

- **Cause**: Caused by the bacterium *Paenibacillus larvae*.
- **Symptoms**: AFB affects bee larvae, causing them to decompose into a brown, ropy mass. Infected brood has a foul smell, and the capped brood cells may appear sunken or perforated.
- **Impact**: Highly contagious and destructive, leading to the death of the colony if not controlled.
- **Control**: Burning infected equipment and hives; in some cases, antibiotics may be used under strict regulation.

3. European Foulbrood (EFB)

- **Cause**: Caused by the bacterium *Melissococcus plutonius*.
- **Symptoms**: Infected larvae die before they are capped, appearing twisted and discolored (yellowish). The hive may have a patchy brood pattern.
- **Impact**: Less severe than AFB but can still weaken colonies, especially under stress.
- **Control**: Requeening, improved colony nutrition, and maintaining strong hive management practices.

3. Nosema Disease (Nosemosis)

- **Cause**: A microsporidian parasite (*Nosema apis* or *Nosema ceranae*).

- **Symptoms**: Causes digestive problems in adult bees, leading to dysentery, lethargy, and reduced honey production. Bees may also be seen crawling near the hive entrance.

- **Impact**: Weakens the colony, reduces lifespan of worker bees, and affects honey production.

- **Control**: Good hive hygiene, providing clean water, and using antifungal treatments like Fumagillin.

4. Varroosis (Varroa Mite Infestation)

- **Cause**: Caused by the *Varroa destructor* mite.
- **Symptoms**: The mites feed on the blood of adult bees and larvae, weakening the colony. Infected bees may have deformed wings, and the hive population declines over time.
- **Impact**: Can lead to colony collapse if untreated. Varroa mites also transmit viruses.
- **Control**: Regular mite checks, use of miticides (e.g., oxalic acid, formic acid), and drone brood removal.

Sustainable practices in honey bee apiculture

- **Integrated Pest Management (IPM)**
- **Description**: IPM involves using a combination of biological, cultural, and mechanical methods to control pests and diseases. It minimizes the use of chemical treatments.

- **Example**: Regular mite checks, using natural treatments like essential oils, and employing mechanical traps for pests like hive beetles.

Natural Hive Materials

- **Description**: Using eco-friendly, natural materials to construct hives promotes a more sustainable beekeeping system. This reduces the environmental impact associated with synthetic or non-biodegradable materials.

- **Example**: Building hives from untreated wood or other natural materials to avoid chemical contamination.

Habitat Preservation and Biodiversity

- **Description**: Providing diverse forage by planting a wide variety of flowering plants, especially native species, helps bees access diverse nutrition and supports ecosystem health.

- **Example**: Maintaining wildflower meadows or planting pollinator-friendly gardens around apiaries to enhance forage availability.

Minimal Chemical Use

- **Description:** Limiting the use of pesticides and synthetic chemicals reduces harm to bees and prevents contamination of hive products.

- **Example:** Opting for organic or natural methods of pest control in both hives and surrounding agricultural practices to prevent bee poisoning.

5. Selective Breeding of Disease-Resistant Bees

- **Description**: Breeding bees that are resistant to common diseases and pests reduces the need for chemical treatments and enhances colony resilience.

- **Example**: Selecting local or hybrid bee strains that exhibit resistance to Varroa mites or Nosema disease.

Avoiding Over-Harvesting of Honey

- **Description**: Sustainable harvesting practices ensure that enough honey and pollen are left in the hive to support the bees during the off-season, especially during times of food scarcity.

- **Example**: Harvesting only surplus honey and leaving enough stores for the bees to overwinter and thrive during dry seasons.

Rotating Hive Locations (Apiary Rotation)

- **Description**: Moving hives periodically to different locations helps prevent the buildup of pests and pathogens in one area and improves bee access to fresh forage.

- **Example**: Rotating hives to areas with abundant, uncontaminated flowering plants and ensuring they are far from pesticide-treated crops.

Maintaining Healthy Colonies

- **Description**: Regular hive inspections and proactive management keep colonies healthy and prevent issues like swarming or colony collapse.

- **Example**: Monitoring for early signs of disease, ensuring proper ventilation, and managing pests like wax moths and Varroa mites without excessive intervention.

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- Thank for your attention.
- We meet next week 7