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Honey Bee's Insect Pests, Diseases and their Management

Wax moth, wasp, hornets, small hive beetle and ants are insect pests of honeybees. American and European foulbrood are bacterial diseases. Thai sac brood is viral disease. Nosemosis and amoebic disease is caused by protozoan. Tracheal mite, Varroa mite and brood mite is non-insect pest of bees. American foulbrood, European foulbrood, Thai sac brood, Nosemosis and amoebic disease are the diseases of honey bees. Make weak colony strong by uniting 2 colonies, regular cleaning of bottom board and increased monitoring of bee hive are management practices for pest and diseases of honey bees.

INTRODUCTION

Honey bees are reared in artificial hives for honey, bee wax and for the help they render in pollinating crop. It is high profit enterprise. The practice of rearing bees is called apiculture or beekeeping. There are four species of honey bees in India – *Apis cerana*, *Apis mellifera*, *Apis florea* and *Apis dorsata* (Sivaram, 2006). Morawetz *et al.*, (2019) recorded minimum 8.1% and maximum 28.4% losses in honey bee colonies due to pest and diseases within one year. There was 20.9 % honey bees colony loss rate due to pest and diseases in the winter in many European and some non-European countries (Despina, 2021). In India greater wax moth and ants are major insect pests of honey bees. An outbreak of Thai sac brood in 1991-92 in India resulted in more than 90 % destruction of the honey bee colonies in South India (Chinmay, 2021).

INSECT PESTS OF HONEY BEES

1. THE GREATER WAX MOTH (*Galleria mellonella*)

Greater wax-moth larva feed on honey, pollen and wax in the comb. Heavy population of wax moth larvae increases hive temperature, thereby affecting brood rearing. These moths are responsible for

heavy economic losses reaching up to 60 to 70 percent to beekeepers in developing countries including India (Komal and Devina, 2020).

THE LESSER WAX MOTH (*Achroia grisella*)

The lesser wax moth larvae feed on comb with pollen or brood cells. Larvae of lesser wax moth are found on the bottom of board among of wax. Larvae forms small canals between bottom of brood cell and brood cells are lifted.

MANAGEMENT OF WAX MOTH

- Unite two weak colonies and make colonies strong as weaker colonies are mostly attacked by wax moth.
- Seal the space in hive through which adult moth can enter in hive.
- Bottom board is regularly cleaned to remove debris.
- Spray of *B. thuringiensis* @ 1.5 ml/10cm². Paramoth (PDB crystals) are used against wax moth.
- Use of low temperature (0 to 10°C) for 5 hours can kill all the stages of was moth.

2. SMALL HIVE BEETLE (*Aethina tumida*)

Small hive beetle larvae damage the comb and feed on honey or pollen stored in comb. Due to feeding of larvae tunnels in hives are formed with disturbance in capping. Feeding activity of larvae causes fermentation and frothiness in the honey which develops a odor like decaying oranges. Due to heavy infestation of larvae honey comes out of the comb.

CONTROL MEASURES

Paradichlorobenzene, a crystalline fumigant is used against small hive beetle. Coumaphos, an organophosphate is registered for use for management of small hive beetle.

3. ANT, WASP AND HORNETS

Honey bees are predated by wasps and hornets mainly in rainy season from late June to August. Apiaries which are situated near foothills and tropical forests are more damaged by wasps and hornets than those on plains. Predation of wasp and hornets causes 20-25% loss in honey bee colonies. Ants take away honey, pollens and honey bee eggs away from the hive and causes nuisance.

4. MANAGEMENT OF ANTS, WASPS AND HORNETS

Strengthening of the bee colonies by uniting two weak colonies, mechanical destruction of wasp nests, discouraging or eliminating nests and destroys wasp nests by fumigation with Aluminium phosphide or calcium cyanide control wasp and hornet. By providing ant pans around the bases of the stand or oil bands over the stands ants can be kept away from beehive.

NON INSECT PESTS OF HONEY BEES

MITES

Honey bee tracheal mite (*Acarapis woodi*), Varroa mite (*Varroa destructor*) and brood mite (*Tropilaelaps clareae*) these are parasitic mites on honey bees. Nymph and adult mites pierce their chelicerae and suck the haemolymph from mite body. Due to feeding hind wing and forewing get separated resembling k shaped wings and bees are unable to fly and crawl in front of hive entrance. Chemicals like sulphur, methyl salicylate and acaricides like Dimite and chlorobenzilate are used against mites.

Birds, toads, squirrel, lizards, rat, reptiles and bear are non-insect pest of honey bees. Netting, use of the bird scarer, placement of colonies in thick canopy of trees, habitat manipulation and reflective tapes are used to keep away birds from apiary.

HONEY BEE DISEASES

BACTERIAL DISEASES

American foulbrood and European foulbrood are two diseases caused by bacteria. Bacteria *Paenibacillus larvae* causes American foulbrood and *Melissococcus plutonius* causes European foulbrood.

Perforated and sunken capping and strange smell like chocolate are symptoms caused by American foulbrood. Roping, sticky larval remains when drawn out with a matchstick are symptoms that found in American foulbrood. The texture of the scales is brittle.

In European foulbrood the texture of the scales is rubbery, melted down, yellowy white larvae. For colonies with heavy infections, use Terramycin antibiotic.

FUNGAL DISEASE

Chalk brood caused by fungus *Ascosphaera apis* and stone brood by *Aspergillus flavus*, *A. niger*. Fungus will consume larva's body giving chalk like appearance.

Sterilization of honey bee with formaldehyde is used for control of fungal diseases.

VIRAL DISEASES

Thai sac brood is caused by *Morator aetatulus*. Spotty brood appearance with darker capping is caused by TSBV. Dead larva dries in brood cell giving sac like appearance. Fumigation with 85 % formic acid@ 5 ml/hive is done for the control of TSBV.

PROTOZOAN DISEASES

Nosemosis caused by *Nosema apis* and *Nosema cerarne*. Distended and swollen abdomen seen in adult bees. Amoebic disease caused by *Malphigamoeba mellifeicae*

DISEASE CAUSED BY MITES

Acarosis (Acarine disease) caused by Tracheal mite, *Acarapis woodi*, Varroosis caused by *Varrora mites Asiatic varroa* and *Varroa destructure*. These mites reproduce on pupa and feed on haemolymph. Apistan or Guard star used against mites.

CONCLUSION

Pest and diseases are the major constraint for the development of beekeeping in India. To protect honey bee colonies from deadly pests and diseases, it is necessary to identify pests and diseases of honey bees.

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