

# IDENTIFICATION, CHARACTERISATION OF DISEASES AND PESTS OF COLONIES OF *A. melleifera*

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## Introduction

Apiculture is collecting honey from wild and domestic bee colonies is one of the most ancient human activities and is practiced worldwide. Gathering honey from wild bee colonies is usually done by subduing the bees with smoke and breaking open the tree or rocks where the colony is located, often resulting in the physical destruction of the nest location which causes Biodiversity loss. Farming being principal source of income in India. Culturing Honey bee will help increasing crop yield as it is now evident that honeybee (Pollinators) increases crop yield. Conservation of bee population is very imperative issue as there is loss of bee population which in turn roots decrease in agricultural productivity and Conservation of Biodiversity is key goal for Sustainable Development. Further Honey bee is prone various bacterial, fungal and viral infections supplemented by parasites and pest/predators which additionally reduce crop productivity and imply threat to biodiversity. Examination and treatment for bee diseases is a crucial part of successful beekeeping. Students tried to recognize and characterise Bacterial, Parasites, and Pest/ Predators

## Material and methods.

1. Observations of colonies throughout year.( combs sealing pattern, Colour, Distribution pattern), Isolation of unusual brood cells, Pests. Comparing observations with standard literature published by United States Department of Agriculture, Agriculture Handbook Number 690.

3. **Stretch test:** A simple way of determining whether AFB caused the death of the brood is the 'stretch test' A small stick, match or toothpick is inserted into the body of the decayed larva and then gently and slowly, withdrawn. If the disease is present, the dead larva will adhere to the tip of the stick, stretching for up to 2.5 cm before breaking and snapping back in a somewhat elastic way. This symptom called 'ropiness', confirms American foulbrood disease, but it can be observed in decaying brood only.

4. **Holst milk test.** The Holst milk test (Holst 1946) is a simple test based on the high level of proteolytic enzymes produced by sporulating *P. larvae*. The test is conducted by suspending a suspect scale or a smear of a diseased larva in a tube containing 3 to 4 ml of 1-percent powdered skim milk in water. The tube is then incubated at 37°C. If AFB is present, the suspension should clear in 10 to 20 minutes. It should be noted that this test is not always reliable.

5. Fauna of British India and Myanmar on Hymenoptera (Vol 1, Vol 2 and Vol 3) by C.T Bhingam and e-Recourses of Biodiversity Library (Hymenoptera) and several other Literatures have been used to classify ants.

6. All Insects and larva isolated while they are infecting hive are in 70 % Ethanol.

**Observation:**

Observation	Presumption	Conclusion
Brood combs of healthy colonies have a solid and compact brood pattern. Almost every cell from the center of the comb outward contains an egg, larva, or pupa. The cappings are uniform in color and are convex (higher in the center than at the margins). The unfinished cappings of healthy brood may appear to have punctures, but since cells are always capped from the outer edges to the middle, the holes are always centered and have smooth edges. On the other hand the caps of healthy brood cells are slightly protruding and fully closed	Colony Survive throughout the year.	<b>Healthy Colony.</b>
variation in pattern distribution of brood combs (first in center then empty combs and then at periphery ie a spotty brood pattern) observations , Dark colour instead of off white to yellow, and deep from centre of comb sealing pattern, sometimes incomplete , Open) . The combs may contain the dried remains of larvae or pupae (called <i>scales</i> ), on the bottom sides of brood cells.	variation in pattern of coloration , distribution and structure indicates infection of Bacteria <i>Paenibacillus larvae</i> .	<b>infection of <i>Paenibacillus larvae</i></b> <b>Confirmed by Stretch test and Holst milk test.</b>
Sometimes Hives are found to be infested with various ants species. Ants attack, taking almost everything in hive, dead or alive adult bees, the brood and honey. Usually attack found to be on weak colonies which may die or abscond.	—	<b>Two species of Ants is Confirmed isolated ants (<i>Oecophylla smaragdina</i>) and the black ant (<i>Monomorium indicum</i>)</b>
Colonies often have patch of deep disordered cells sometimes in heavy infestations, frame pieces may be weakened to the point of disintegrate, unattended hive almost always suffer considerable damage often seen in <i>A. cerana</i> , causing colonies to abscond. Sometimes off-white larvae is seen producing tunnel. Web like structure seen very similar to web made by spider but very dense and white in colour.		<b>Pest identified to be <i>Galleria mellonella</i></b>

**Conclusions:**

*A. mellifera* colony when inspected through year, often gets infected with *Paenibacillus larvae*, a bacterial infection which is perennial, in addition this and weak colonies further are damaged by opportunistic infection of Hymenoptera : Formicidae, two species of Ants intruding and damaging developing larva and feeding on honey identified to be *Oecophylla smaragdina* and the black ant *Monomorium indicum*. Pest/Predator classified to be *Galleria mellonella*, more to colonies with unsealed gaps in wooden box. Infection seem to occur more frequent in summer as availability of nectar, pollen is inadequate.