

PRACTICAL 17

FAMILIARIZATION WITH DISEASES OF HONEY BEES AND THEIR CONTROL

Aim: To familiarize with honey bee diseases, their symptoms and management.

Honey bees are attacked by a large number of diseases which are caused by different organisms including virus, bacteria, microsporidian parasites and mites both ectoparasitic and endoparasitic. The extent of damage varies from death of some brood or adults to complete loss of colonies. The disease spreads from one colony to other through different manipulations done in the apiary as well as through robber bees, swarms and drifting bees. Brief account of symptoms and control measures is given in the tabular form below which can also help in differentiating one disease from the other.



Figure 17.1 Healthy worker brood of *A. mellifera* (Photograph by Dr B S Rana)



Figure 17.2 European foul brood disease in *A. mellifera* (Photograph by Dr B S Rana)



Figure 17.3 Sac brood disease in *A. mellifera* (Photograph by Dr B S Rana)



Figure 17.4 Symptoms of nosema disease in *A. cerana* (Photograph by Dr B S Rana)

BEE DISEASES:**Brood diseases:**

	American Foul Brood	European Foul Brood	Sac Brood/Thai sac brood
Causative Organism	<i>Paenibacillus larvae</i> (bacteria)	<i>Melissococcus pluton</i> (bacteria)	Virus (sac brood in <i>A. mellifera</i> and Thai sac brood in <i>A. cerana</i>)
Time of death	Late larval or early pupal stage	Coiled larvae in unsealed cell (usually young unsealed larvae sometime older sealed larvae)	Late larval stage; (usually older sealed larvae sometimes young unsealed larvae)
Cappings	Sunken and punctured	Dead brood in uncapped stage	Capping removed or punctured often with two holes.
Colour of dead brood	Off white to light cream to brown; coffee brown to dark brown or almost black	Yellowish white to grey or dark brown, dark brown or almost black (Fig. 17.2) as compared to glittering white in case of normal brood (Fig. 17.1)	Straw coloured, starts darkening from head
Position of dead brood	Lying flat on cell base	Coiled, twisted or collapsed	Extended with head curled upright in cells (Fig. 17.3)
Consistency of dead brood	Sticky to ropy	Soft and gummy ; rarely sticky or ropy, granular	Sac like with watery content
Odour of dead brood	Glue pot, putrid faint	Slightly sour to penetratingly sour, Putrid fish	None to slightly sour; faint sour
Type of brood affected	Worker, rarely drone or queen	Worker, drone and queen	Worker only
Control	Terramycin @ 0.250 – 0.400g in 5lt sugar syrup feeding	Feed Terramycin @ 0.2g in 500ml conc. sugar syrup	No effective cure

Adult diseases:

	Nosema disease	Acarine disease
Causative organism	<i>Nosema apis</i> and <i>Nosema ceranae</i> microsporidian parasites (earlier under Protozoa; now under cluster of fungi)	<i>Acarapis woodi</i> (Endoparasitic mite)
Symptoms	Infected bees collect in front of hive, sluggish, crawlers on leaf blades, distended abdomen, dysenteric (Fig. 17.4)	Bees gather in front of hive as crawler bees and unable to fly; disjointed wings having typical 'k' wing condition
Control	Feed fumigillin 200 mg in sugar syrup to each colony or 0.5-3.0 mg in 100ml sugar syrup. or Two feedings at weekly interval of Dependel-M @0.5g/litre/colony	Fumigate using folbex strips at weekly intervals or with formic acid (85%) @ 10ml/colony and replenish the quantity after every 24 h for 21 days

Practical things to do:

- i. Check the colonies and see bacterial/virus infested brood and record your observations. Note down the symptom of bee disease you have observed
- ii. Treat the infected colony with required dose of antibiotics and note down the procedures followed
- iii. Fumigate the colony with required dose of formic acid to control acarine disease and draw a diagram of the process.