
CONTINENTAL TRAINING OF TRAINERS (TOTs) ON BEE DISEASES AND PESTS, PREVENTION AND CONTROL

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(Sponsor: AU-IBAR)

Pest Identification Sheet

Introduction

Honey bees are truly social insects in every sense of sociality. They accumulate various hive products such as honey, pollen, wax and propolis, known to possess unique properties and qualities for which they are harvested and used. However, humans' are not the only living organisms that exploit honey bees. Several animals (vertebrate and invertebrate) exploit honey bees and their products for various purposes often inflicting damage in the process on honey bees, with invertebrate known to cause the most damage. Key honey bee pests in Africa include the small hive beetle, varroa destructor, wax moths, large hive beetles and bee louse. This fact sheet provides brief notes on how to identify these pests, guidelines which should aid sample sorting and storage of bee pests across the continent.

1. ***Varroa destructor*** : This is a mite commonly referred to as Varroa mite. It is a native brood parasite to the Asian honey bee *Apis cerana*. Currently, it is an invasive pest of honey bees *Apis mellifera* species worldwide and present on every continent. It cause direct injury by feeding and reproducing on developing worker and drone brood either resulting in deformed adults or death of developing brood. Indirectly, it transmits various honey bee viruses implicated in colony losses across Europe and the USA.

Taxonomy

Kingdom: Animalia

Phylum: Arthropoda

Class: Arachnida

Order: Mesostigmata

Family: Varroidae

Genus: Varroa

Species: *V. destructor* (Anderson and Trueman, 2000), *V. jacobsoni* (Oudemans, 1904), *V. underwoodi* (Delfinado-Baker and Aggarwal 1987), *V. rindereri* (De Guzman and Delfinado-Baker, 1996)

Description and Occurrence

Most adult mites encountered in the honey bee colony are females. The adult mite is ovoid in shape, reddish-brown in colour, approximately 1.5 mm in width and has 4 pairs of legs. Immature stages have a similar shape but are smaller in size and appear whitish.

Adult and immature mites occur inside sealed brood cells of workers and drones while only adults occur on bodies of adult bees (queen, drone and workers).

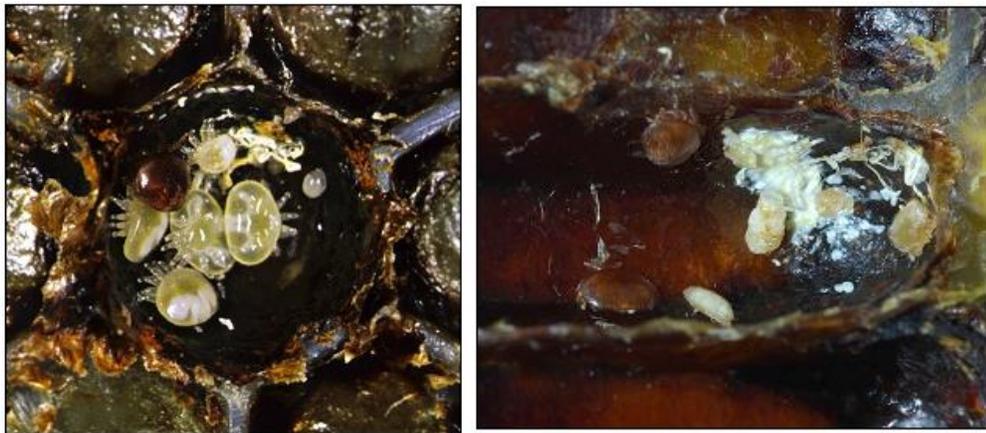


Fig. 1. A family of mites with mother (reddish-brown), offspring (cream white) and faeces (pearly white deposits) at the bottom of a brood cell.



Fig. 2. Adult mites on bodies of honey bee adult and pupa.



Fig.3. Dorsal and ventral view of *Varroa* mite (female).

2. ***Aethina tumida***: Also known as the small hive beetle (SHB), this beetle is a parasite of honey bees. It is native to Africa and currently an invasive pest in the Americas and Australia. The adults feed on honey bee pollen and honey inside the colony. Females lay eggs within openings, crack and crevices inside the colony which develop into larvae that feed on pollen and honey. The larval stage cause more damage than the adults resulting in fermentation of pollen stores, contamination of honey with faeces and destruction of the comb structure. Also, the SHB has been demonstrated to be capable of transmitting honey bee disease.

Taxonomy

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Nitidulidae

Genus: *Aethina*

Species: *A. tumida* (Murray 1867)

Description and occurrence

Adult SHB is 5 – 7 cm long and 2 – 4 cm wide. It is dark brown to black in colour and oblong in shape. Adults occur everywhere inside a honey bee colony but are predominantly on the bottom board. The adult SHB can be distinguished from other Nitidulids by its transverse procoxal cavities, grooved metacoxae, dilated tarsal segments, small fourth tarsi and 3-segmented antennal club.

The larval stage of SHB is approximately 9.5 mm long and 1.6 mm wide at its last stage (wandering larval stage). It is cream white in colour and has 3 pairs of thoracic legs with no abdominal prolegs. Its characteristic feature which distinguishes it from other Nitidulid larvae is the presence of two rows of spines on its dorsal surface (Fig. 5)



Fig.4. Dorsal and ventral view of adult *Aethina tumida*



Fig.5. Dorsal and ventral view of *Aethina tumida* larva

3. ***Oplostomus* species:** Two members of the genus *Oplostomus*, namely *O. fuliginus* and *O. haroldi* are currently the only scarab pests of honey bees in Africa. Only adults of both species cause damage by feeding on brood, pollen and honey with a greater preference for brood. They occur seasonally in honey bee colonies.

Taxonomy

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Scarabaeidae

Genus: *Oplostomus*

Species: *O. haroldi* (Witte) and *O. fuliginus* (Olivier)

Description and occurrence

Both *Oplostomus* species are 1.3 – 1.9cm long and 1.1-1.3 cm wide with females slightly larger than males. Infesting adults mostly occur on the frames containing brood inside honey bee colonies. Both species can be

distinguished from one another by several morphological characteristics and geographic range, summarized in the table below.

Table 1. General differences between *Oplostomus* species

	<i>Oplostomus fuliginus</i>	<i>Oplostomus haroldi</i>
Geographic range	Western, Eastern and Southern Africa	East Africa
Body colour	dark brown to black	usually black and sometimes with colour stripes in brown, orange and yellow
Head	Elevated ridges around eye with a central one on the upper lip, clypeus	No central ridge present on upper lip
Elytra (hard wing)	Possesses 2 prominent grooves and appeared granulated	Possesses 1 prominent groove and smooth in texture



Fig.6. *Oplostomus* species in Africa. (a) *O. fuliginus* and (b) *O. haroldi*

4. **Wax moths:** The name “wax moth” is a common name for two species of moth that invade and damage bee colonies. One is known as the greater wax moth, *Galleria mellonella* and the other the lesser wax moth, *Achroia grisella*. The greater wax moth is larger in size, more common and the most destructive compared to the smaller less prevalent lesser wax moth. Both moths lay eggs inside the honey bee colony which hatch into the larva which is the destructive stage. The larva feeds on the honey bee comb structure, its contents (pollen and honey) and spins webbings as it does so. As the larva gets older, it deposits faeces and casts larval skin inside the beehive. Wax moths show a preference for older combs (dark combs) in which brood has already been reared.

Taxonomy

- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Insecta
- Order: Lepidoptera
- Family: Pyralidae
- Genus: *Galleria, Achroia*
- Species: *G. mellonella* and *A. grisella*

Description and occurrence

Although similar in appearance and cosmopolitan in their geographic distribution, both wax moth species can be delineated from one another by distinct morphological features summarized in the table below.

Table 2. Morphological differences between greater and lesser wax moth life stages

Life stage	Lesser wax moth	Greater wax moth
Egg	Reticulation limited to anterior end with conspicuous carinae around primary cells (Fig.	Reticulation faintly visible over entire egg surface, with primary cell carinae

	7.)	of equal width (Fig. 7.)
Larva	Stemmata absent and spiracle with a black peritreme thicker on posterior margin (Fig. 8 &9)	Head with 4 stemmata on each side and spiracle with a yellowish peritreme of uniform thickness (Fig. 8& 9)
Adult	Fore wing breadth less than 5 mm, the termen of its forewing is convex (Fig. 10 &11)	Fore wing breadth 5 -7 mm, the termen of its forewing is concave (Fig 10 & 11)

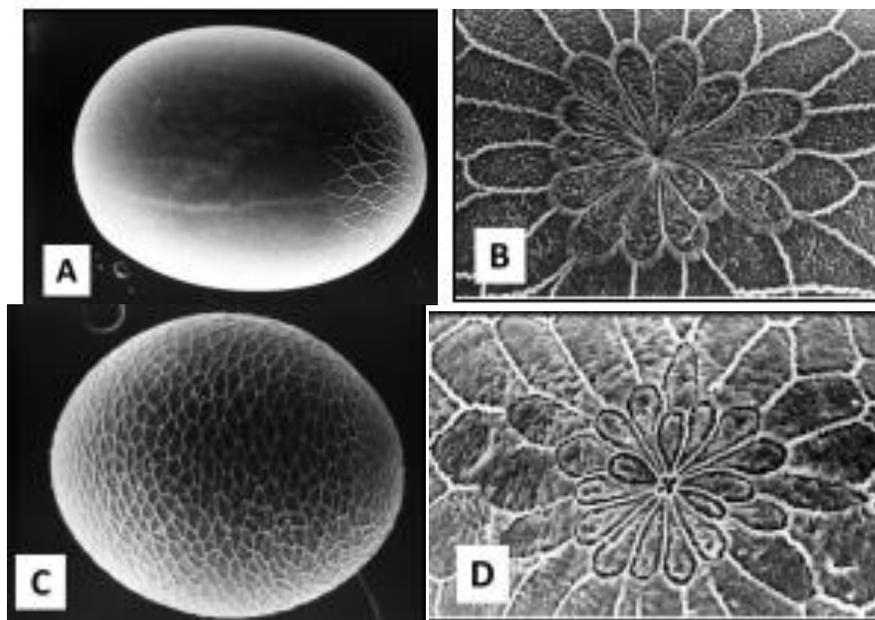


Fig. 7. The lateral and micropylar views of the greater and lesser wax moth eggs showing reticulations. A & B – lesser wax moth and C & D – greater wax moth.

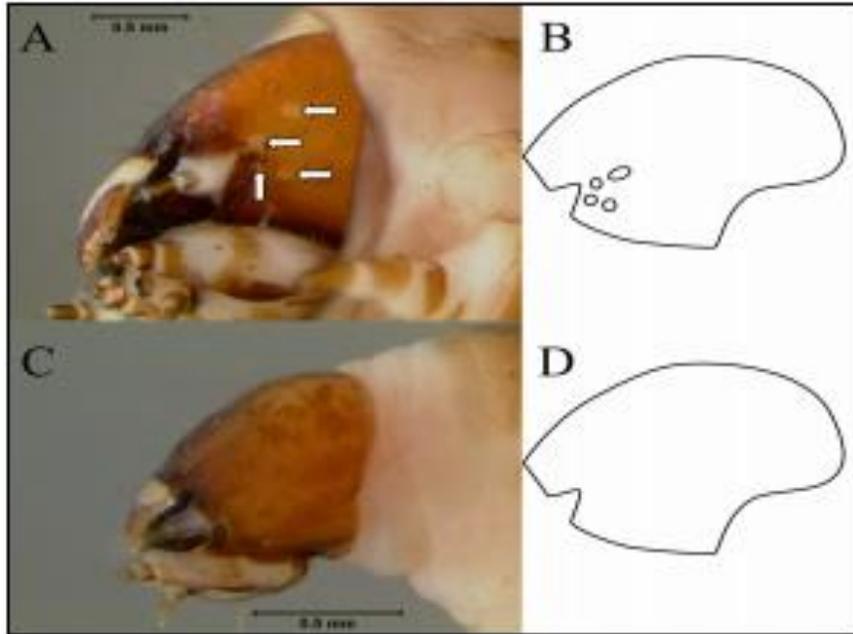


Fig. 8. The lateral views and schematic representations of the greater and lesser wax moth larva heads. Pictures reveal the presence and absence of stemmata in the greater wax moth (A & B) and lesser wax moth (C & D) respectively.

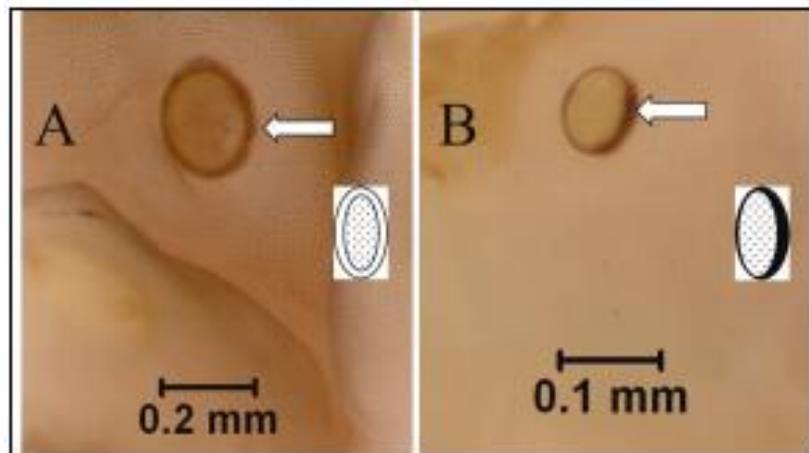


Fig. 9. The spiracles of the greater (A) and lesser wax moth (B) larvae showing the peritreme



Fig. 10. Greater (left) and lesser (right) wax moth adults. The upper specimens represent males and the lower ones, females.

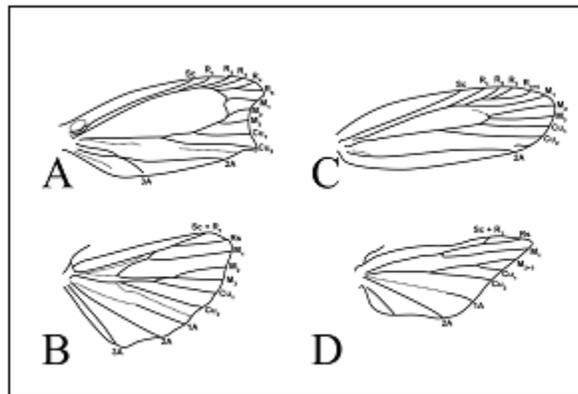


Fig. 10. Sketches of the fore and hind wings of the greater (A & B) and lesser (C & D) wax moth adults showing their termen.

References

Dietemann V, Ellis J D and Neumann, P (2013). Beebook Volume II: Standard Methods on *Apis mellifera* pest and pathogen research. IBRA, UK.

Baldwyn Torto, Ayuka T. Fombong, Daniel M. Mutyambai, Richard T. Arbogast and Peter E. A. Teal. (2010). *Aethina tumida* (Coleoptera: Nitidulidae) and *Oplostomus haroldi* (Coleoptera: Scarabaeidae): Occurrence in Kenya, Distribution within Honey bee Colonies, and Responses to Host Odors. *Annals of the Entomological Society of America* 103 (3): 389 – 396.