



The High Level Expert Consultation on Coconut Sector Development  
FAO Regional Office for Asia and the Pacific, Bangkok, Thailand  
30 October – 1 November 2013

# IPM of Important Insect Pests of Coconut

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## What is “IPM”?

- a strategy that integrates various control methods , pesticides will be the last option
- not only cost effective but prioritized human and environmental safety
- based on farmer’s knowledge, acceptance, and education





# Important coconut pests

- Rhinoceros beetle
- Red palm weevil
- Coconut hispine beetle
- Coconut black headed caterpillar
- Coconut scale



# Rhinoceros beetle



- *Oryctes rhinoceros*
- adults are the destructive stage



**Symptom of damage**



**Symptom of  
damages**



Life cycle

23-28 days



10-12 days

80-150 days





**Breeding site of the rhinoceros beetle**





• **Breeding site of rhinoceros beetle**



**Management of Rhinoceros beetle**

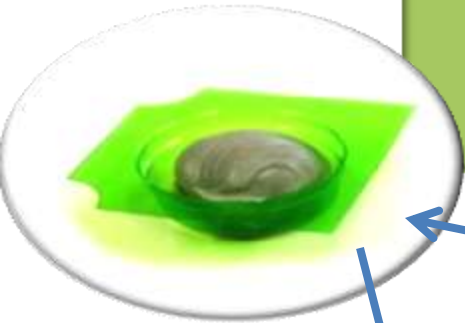


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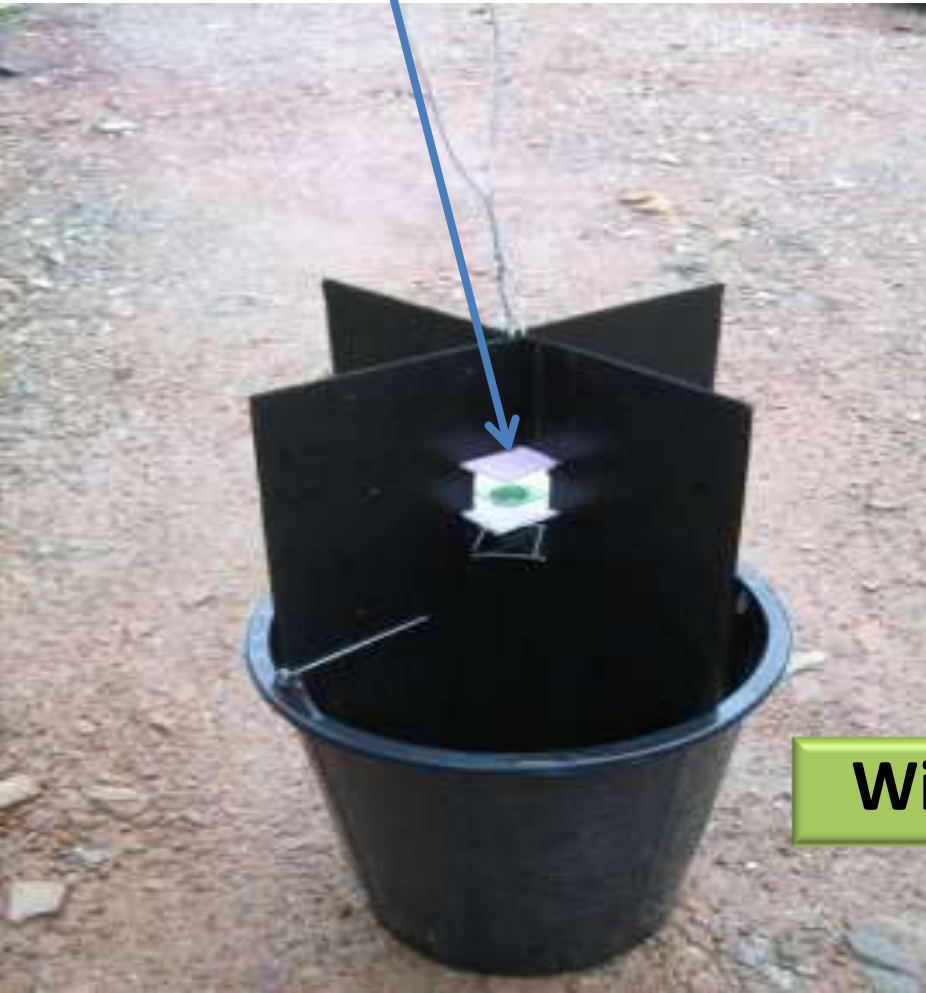
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# Pheromone trapping



Pheromone



Winged trap





**Pheromone trap (1 trap/2 hectares)**



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# *Oryctes* Baculovirus



Infected



Healthy



**Infecting adult beetles with baculovirus**



# Red palm weevil



# Life cycle of red palm weevil



3 days



30 – 40 days



115 – 117 days



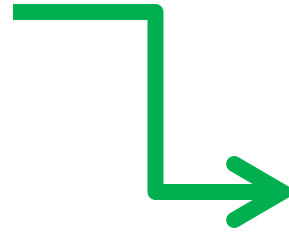
# Red Palm Weevil: Symptoms of damage



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Ministry of Industrial Crops, DOA, Bangkok, Thailand on 29 Mar. 2012



**Control**

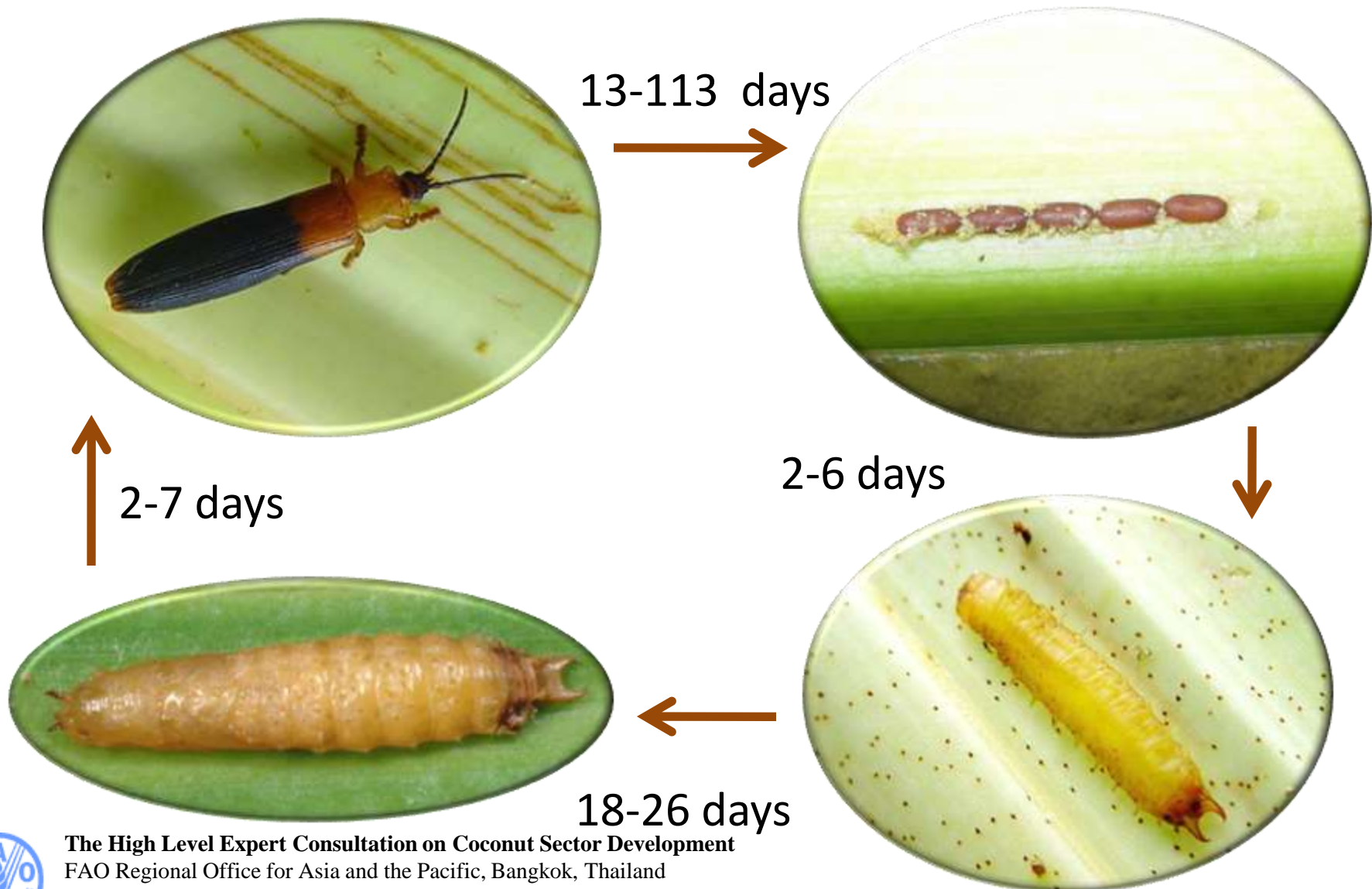


# Coconut hispine beetle

- *Brontispa longissima* (Gestro)
- Native to West Java
- Invaded SE Asia, Pacific Region
- Adults and larvae feed among the young unopened leaflets
- BC can keep the pest under control



# Life cycle of *B. longissima*





Symptom of damages



## **2 species of parasitoids use for BC of CHB:**

1. Larval parasitoid (*Asecodes hispinarum*)





# Mummified larvae of CHB



## 2. Pupal parasitoid (*Tetrastichus brontispae*)



**Mummified pupae of CHB**





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**October 29, 2005**





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**April 28, 2006**





**Recovery of the coconut palms**



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# Coconut black headed caterpillar

- Sci. name: *Opisina arenosella*
- Only immature stages are destructive to coconut palm
- Exotic pest of SE Asia and the Pacific Regions
- Native to S. Asia: India, Sri Lanka
- In Thailand, 1<sup>st</sup> found in 2008



**Adult longevity = 15-20 days  
produce 49-490 eggs/female**



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# Egg mass of CBHC (3-5 days)



**Total larval stages = 32-48 days**



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# Pupa of CBHC (9-11 days)



# Symptom of damage



# Symptom of damages



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# Symptom of damage on fruit



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# Host plants



# Management of CBHC

- **No insecticide spraying recommended**
- **Removing infested leaves**
- **Bt**
- **Trunk injection**
- **Releasing parasitoid**





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A photograph of a coconut plantation under a clear blue sky. The trees are tall and slender, with some showing signs of infestation, such as dark, damaged fronds. The ground is covered in green grass and other vegetation. The text 'Removing of infested fronds' is overlaid at the bottom of the image in a large, white, sans-serif font.

**Removing of infested fronds**

# Recovery of the palms



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# Application of *Bt*.

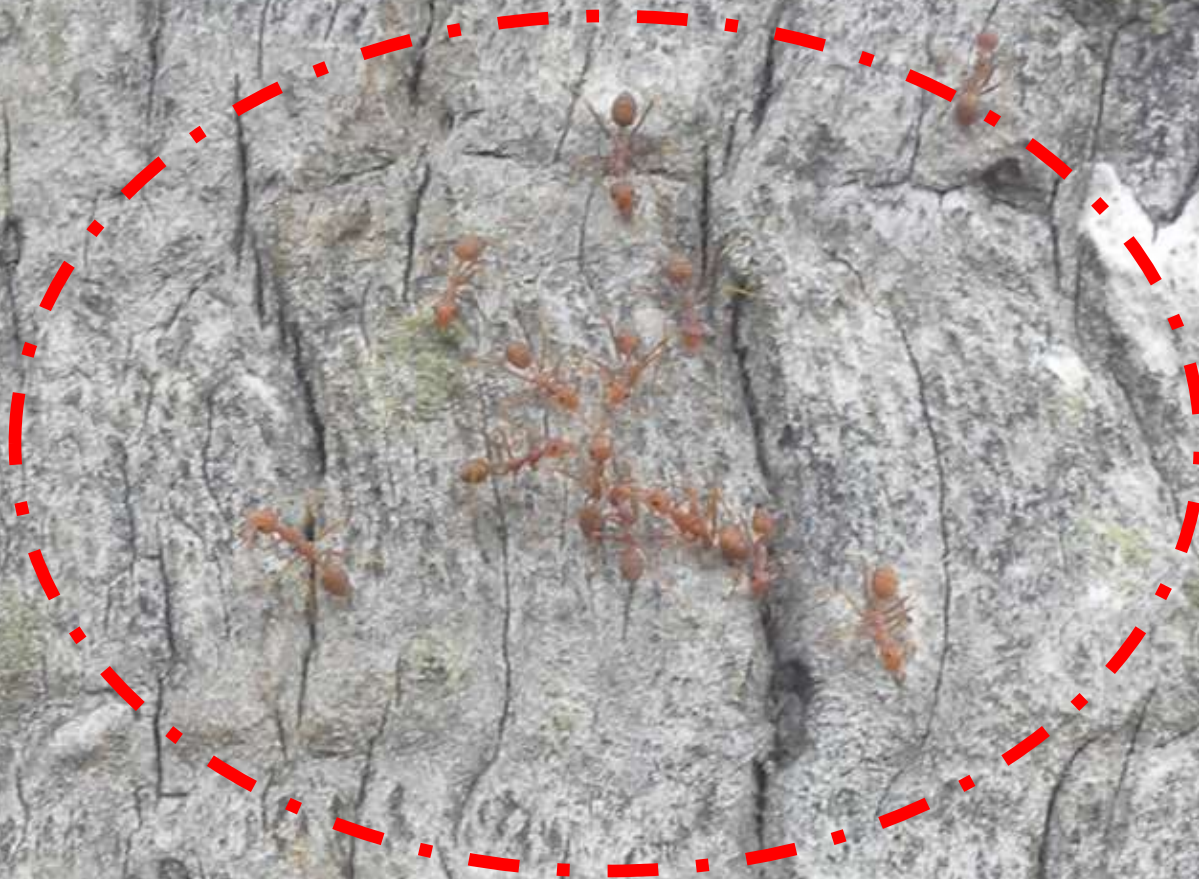


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# Trunk injection and apply with Emamectin benzoate 1.92% EC 30 cc/palm



# Red ants



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# *Goniozus nephantidis*



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# *G. nephantidis*

- **Most effective gregarious parasitoid**
- **Mass produced easily on *rice moth larvae***
- **8-12 parasitoids/*Corcyra* larva**
- **Female biased sex ratio**
- **Fecundity 60-70/female**
- **Natural parasitism 28-48 %**
- **Commercially produced**



***G. Nephantidis* laying eggs on CBHC**



**Young larvae of *G. nephantidis***



***G. nephantidis* larvae feeding on CBHC**



**Cocoon of *G. nephantidis***



**Coconut scale**

# Coconut moth, *Artona catoxantha*



# Nettle caterpillars







# Conclusions

- Important insect pests are Rhinoceros beetle, red pal weevil, Coconut hispine beetle and black headed caterpillar
- Management of RB and RPW:
  - Sanitation in orchards and surrounding
  - Removing of dead palms, removing and reducing of breeding sites
  - *Metarrhizium anisopliae* + Baculovirus
  - Pheromone trap + Baculovirus



# Conclusions

- Management of CHB by mass rearing and releasing of 2 species of parasitoids:
  - *Asecodes hispinarum*
  - *Tetrastichus brontispae*
  - Releasing 30-60 mummies/hectare for 3 times with 7-10 days interval



# Conclusions

- **Management of CBHC:**

- No insecticide spraying recommended
- Removing and destroying infested fronds
- Bt
- Mass rearing and releasing *G. nephantidis*
- For severe outbreak: Chemical should be applied by trunk injection with emamectin benzoate 1.92%EC, 30 cc/palm



**Thank for your attention**



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Hat Khanom-MU  
backpacker2007