

**B.Sc. Horti. VIth Sem**

**Insect pests of Vegetable, Ornamental, and  
spice crops (PPH-322)**

**Topic name: Fruit Borer of Tomato *Helicoverpa armigrera*  
Description and management**



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# SYSTEMATIC POSITION

<b>KINGDOM</b>	<b>Metazoa</b>
<b>PHYLUM</b>	Arthropoda
<b>SUB PHYLUM</b>	Uniramia
<b>CLASS</b>	Insecta
<b>ORDER</b>	Lepidoptera
<b>FAMILY</b>	Noctuidae
<b>GENUS</b>	<i>Helicoverpa</i>
<b>SPECIES</b>	<i>H.armigera</i>

# INTRODUCTION

- Most Polyphagous and cosmopolitan pest.
- Larvae attack more than 60 species of cultivated and wild host plants.

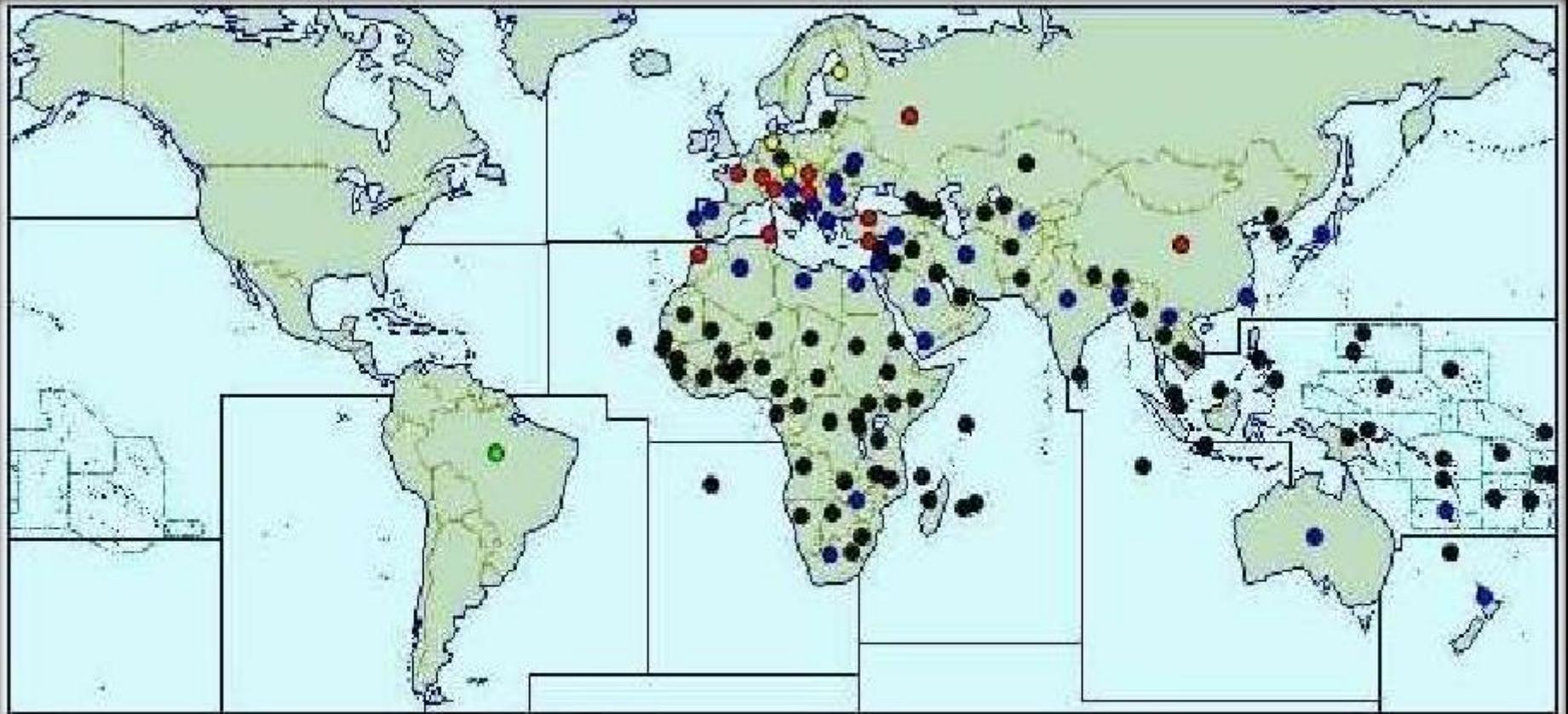


**TOMATO**

**BHENDI**

**ORNAMENTAL  
PLANTS**

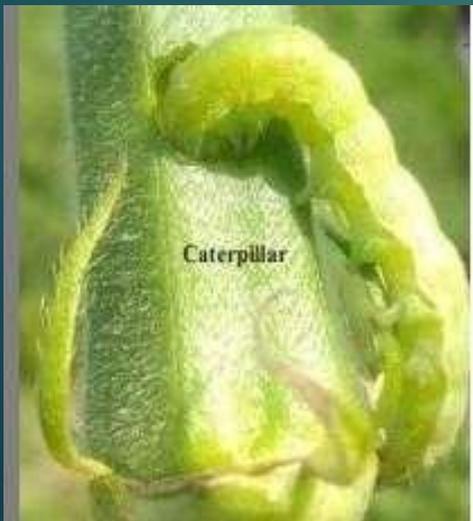
# GEOGRAPHICAL DISTRIBUTION



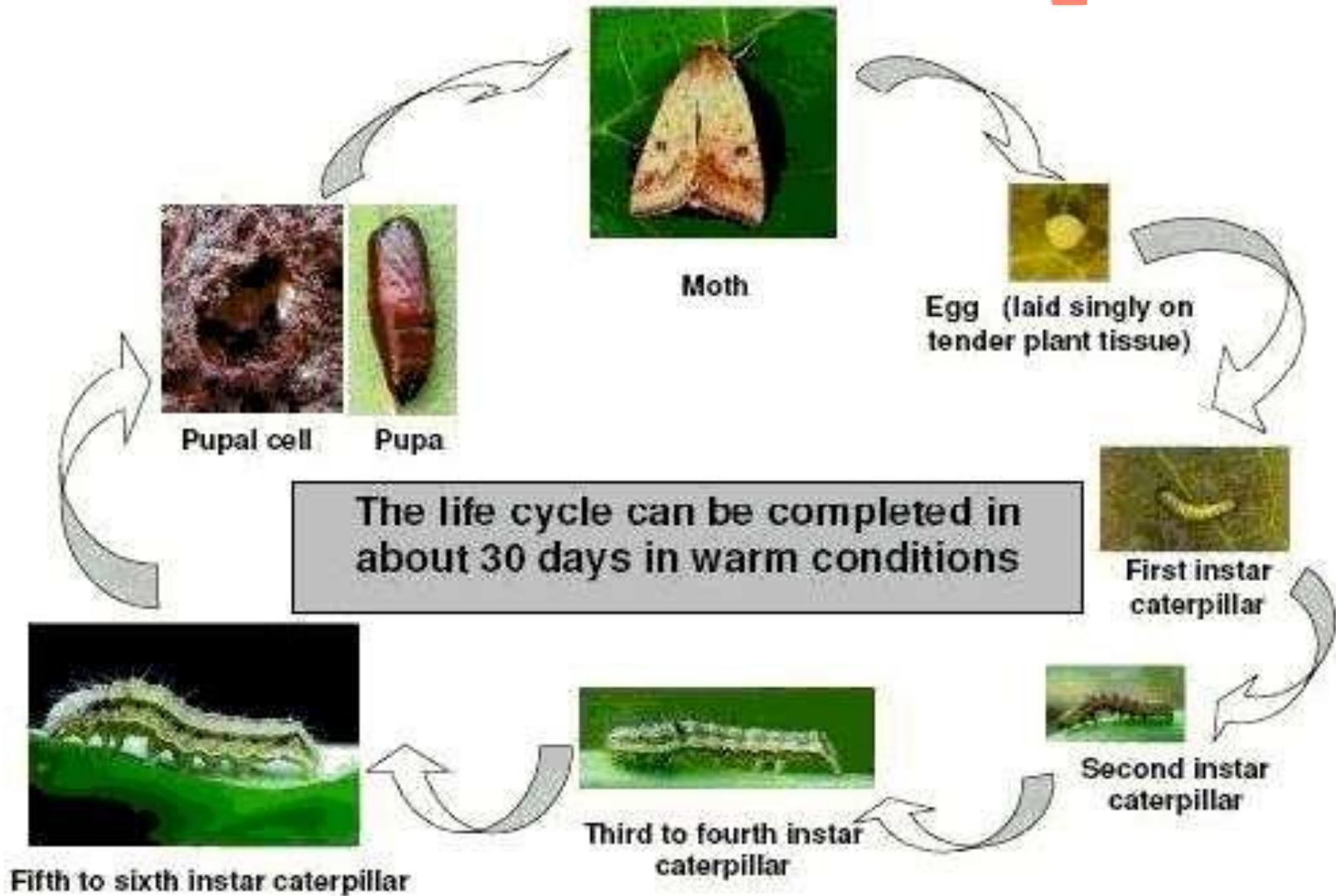
- = Present, no further details
- = Widespread
- = Localised
- = Confined and subject to quarantine
- = Occasional or few reports
- = Evidence of pathogen
- = Last reported...
- = Presence unconfirmed
- = See regional map for distribution within the country

# Symptoms of damage

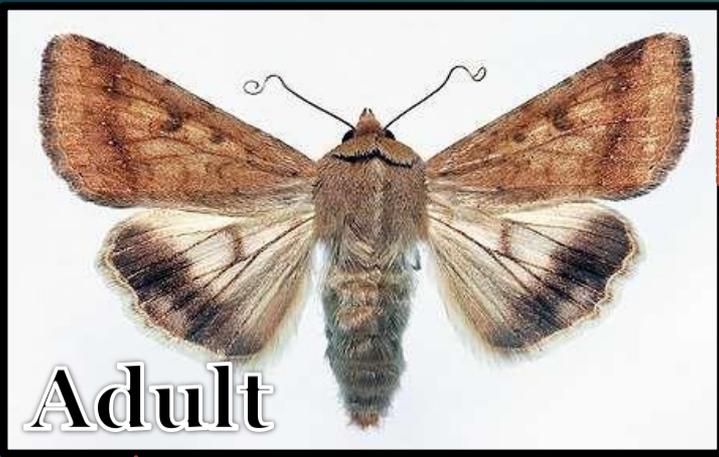
- 1) Young larvae feed on tender foliage.
- 2) Mature larvae bore circular holes on fruits.
- 3) Thrust only a part of its body into fruit and eat the inner content.



# Identification of the pest



Life cycle of *H. armigera*



Adult



Egg

10-14 days

5-8 generations/yr

2-4 days



Pupa

15-24 days



Larva

# IDENTIFICATION OF THE PEST

D



## 1. Egg



- Spherical eggs are yellowish white colour when laid but changes to dark brown as they mature.
- Singly laid
- Diameter: 0.4mm to 0.6mm
- Close to hatching – Black head capsule is visible through the egg shell.

## 2. Larva

- Shows colour variation from greenish to brown.
- It has dark brown grey lines on the body with lateral and also has dark band.



# 3. Pupa



- When the last larval instars are about to become pupae, the larvae will burrow and enter the soil to pupate.
- Pupae are 14-18mm length, brown smooth surface and rounded anterior and posterior.
- Not all pupae will develop into adults without pupal diapause.
- Pupal diapause varies and highly dependent on temperature and photoperiod.



# 4. Adult

- Forewing: olive green to pale brown with a dark brown circular spots in the centre.
- Hindwing: pale smoky white with a broad blackish outer margin.
- Female- Light pale brownish yellow snout moth.
- Male- Pale greenish moth V shaped speck.



# Management practices

PHYSICAL METHOD

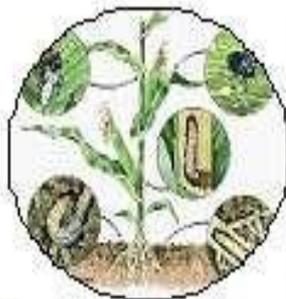
MECHANICAL METHOD

CHEMICAL METHOD

BIOLOGICAL METHOD



Pheromone traps



Resistant varieties



Today is

1  
Altered date of  
sowing  
Wednesday

Wednesday

Wednesday



Predators



Botanicals



Light trap

## PHYSICAL METHOD



Collection and destruction of damaged fruits and grown up caterpillars.

Removal of alternate hosts

*Datura*



*Tridax*



*Gynandropsis*





CULTURAL METHOD



Avoid monocropping

*Intercrop*: Onion, Black gram, Green gram, Cowpea, Soyabean, Maize, Clusterbean

Grow *castor* in one or two lines/border

Optimal use of *N - fertilizers*

Cont...

Judicial water management

Grow simultaneously 40 days old American tall *marigold* and 25 days old tomato seedling at **1:16 rows**

Grow less susceptible genotypes  
**Rupali, Roma, Pusa red plum.**



## MECHANICAL METHOD

Setup pheromone trap with *Helilure* @ *15/ha* and change once in 15 days.

Setup of *light traps* (125 W) – to monitor insect activity



**गामा-ल्योर**  **LURE-Ha**

Pest : *Helicoverpa armigera*  
B. No. : GLH-03  
Mfg. Date : DEC. 2011  
Exp. Date : 2 Years from Prod. Date  
M.R.P. : Rs.40/- Each Lure  
Instructions: Store in Cool & Dark Place.  
Contents : Sex Pheromone of *H. armigera*  
Viability : 20 to 30 Days after installation

Mfg. by: **GAMA ORGANOMED Plus (P) LTD.**  
(Technology in green)  
Corp. Off.: J-805, Ansal Neel Padam Kunj,  
Ghaziabad - 201010 (U.P.)  
Works : E-223, UPSIDC, Kure Road, Barabanki, U.P.



# NPV formulation and symptom

**CHEMICAL METHOD**

<b>INSECTICIDE</b>	<b>FORMULATION</b>	<b>DOSE</b>
Azadirachtin	1.0% EC	2.0 ml/lit
Indoxacarb	14.5% SC	8 ml/10 lit
Flubendiamide	20 WG	5 g/ 10 lit
Novaluron	10% EC	7.5 ml/ 10 lit
Phasalone	35% EC	13 ml/ 10 lit
Quinalphos	25% EC	1.0 ml/ lit

**NOCTOVI - Adulticide**

## BIOLOGICAL METHOD

Spray *HaNPV* @ 500 LE/ha along with cotton seed oil 300 g/ha to kill larvae.

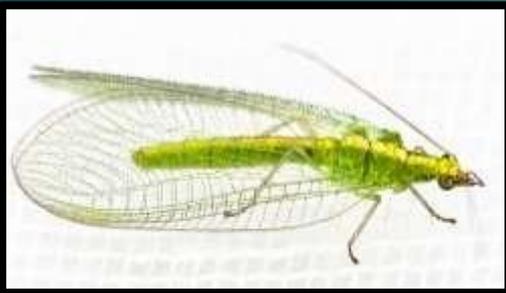
Three releases of *T. chilonis* @ 15 days interval from 45 DAS @6.25 cc/ha

Release *Chelonus blackburni* (Egg larval parasitoid)



Cont...

Two releases of *Chrysoperla carnea* @ 1 lakh grubs/ha – 6, 13 and 14<sup>th</sup> weeks after sowing



Encourage activity of parasitoid *Eucelatoria bryani*, *Campoletes*, *Chelonus* etc.,



*E. bryani*



*Campoletes*



*Chelonus*

Cont...

The combination product of NPV  $1.5 \times 10^{12}$  POB/ha + Malathion and NPV ( $1.5 \times 10^{12}$  POB/ha) + Azadirachtin 2% are also effective.

Spray 5% NSKE or Neem oil 1%



HaNPV + *Bacillus thuringiensis* (BTK) SC

## Predatory diversity in Tomato



Adult, *Coccinella septumpunctata*



Adult, *Cheilomenes sexmaculata*



Grub, *Coccinella septumpunctata*



Adult, *Chrysoperla carnea*



Grub, *Chrysoperla carnea*



Syrphid adult



Syrphid Grub

# References

[www.agriinfo.in](http://www.agriinfo.in)

<http://helicoverpaaspests.weebly.com/helicoverpa-spp-as-pest.html>

<http://slideplayer.com/slide/8554206/#>

**Thank you**