# ENTOMOLOGY BULLETIN: NO.34

# HELIOTHIS CATERPILLARS

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## INTRODUCTION

Caterpillars of *Heliothis armiger* are serious pests of a wide range of crops in Papua New Guinea. Crops which are often badly damaged include corn (maize), sorghum, tomato, capsicum, tobacco and a range of legumes. Heliothis caterpillars also feed on cabbage, cocoa, carnation, coffee, lettuce, potato, pumpkin, rice, sweet potato, taro, tea and watermelon. The caterpillars feed on the leaves, young developing shoots, flower buds, flowers and developing seeds and fruits. Heliothis caterpillars as a pest of sorghum are discussed in Entomology Bulletin No. 35. This bulletin deals with heliothis caterpillars as pests of other crops.

## NAMES

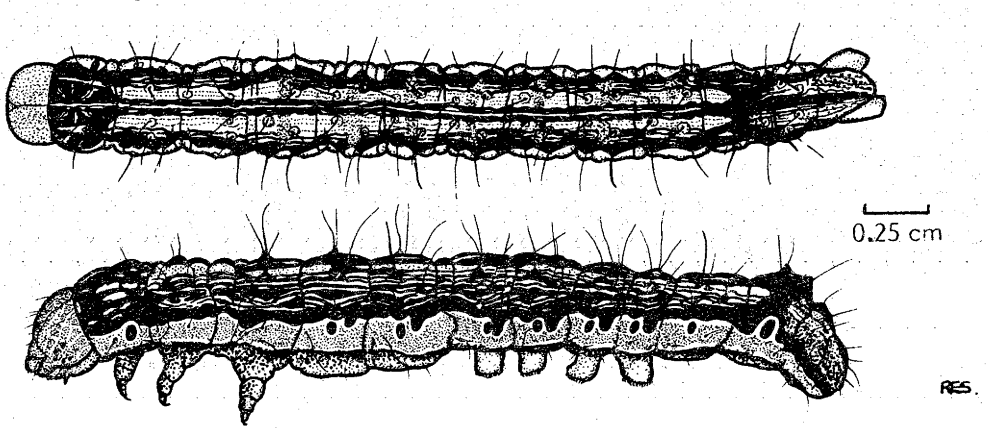
Because heliothis caterpillars feed on such a wide range of crops they have been given many different common names according to the crop on which they are found. Common names in use in Papua New Guinea include: corn earworm, tomato grub, tomato fruitworm, tomato caterpillar, sorghum caterpillar, tobacco budworm, bean podborer and flower caterpillar. In this bulletin they are called heliothis caterpillars.

## DESCRIPTION

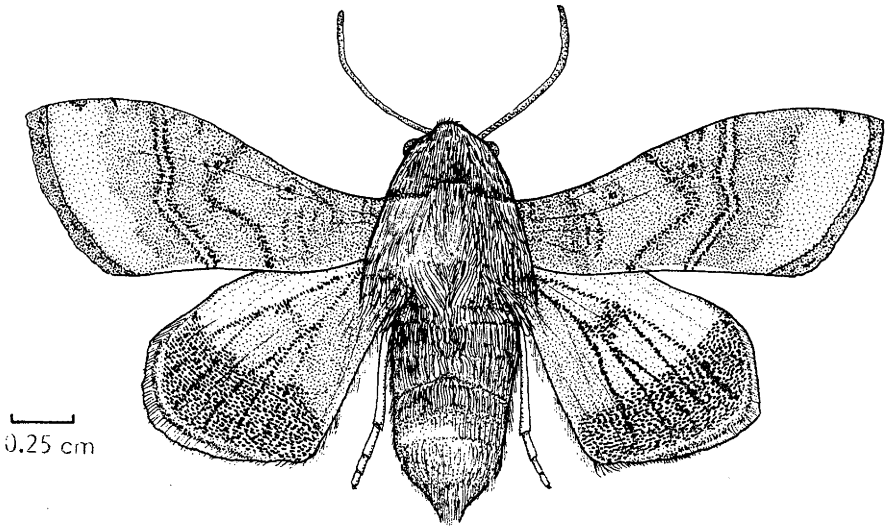
Fully grown heliothis caterpillars can be almost black, brown, green, light brown or pink. There are 3 dark lines along the body: one along the back and the other two along the sides. The dark lines are separated by broader pale bands. These are shown in the picture below.

## BIOLOGY

The female moths lay their eggs at night, singly, on the leaves, shoots or flower buds of the host plants. The eggs are shiny-white at first, changing to light greenish-yellow. They are dome shaped and ribbed.




*A fully grown heliothis caterpillar, viewed from the top and the side to show the pattern of dark and pale bands (About 3 times natural size.)*




Heliothis armiger - *the adult moth (About 3 times natural size.)*

After they hatch, the small heliothis caterpillars first eat their egg shells. They then start to feed on various parts of the host plant, often causing severe damage. As they grow they moult (change their skins) four or five times. Fully grown caterpillars are about 4 cm long.

The fully grown heliothis caterpillars then burrow into the soil where they pupate (enter the resting stage). Sometimes they pupate on the host plant, for example inside corn cobs or pods of legumes.

The adult moths emerging from the pupae have stout bodies, yellowish-grey to orange-brown or reddish-brown forewings marked with fine dark wavy lines, and pale brown hindwings with a dark border. The wing span is about 3.5 cm. The adults are nocturnal (active during the night) and are not often seen during the daytime.

The length of the life cycle varies according to temperature. In the Lae area heliothis eggs hatch in 3-4 days, the caterpillar stage lasts 23-25 days and the pupal stage 14-17 days. In the highlands the length of these stages is longer.

## ECONOMIC IMPORTANCE

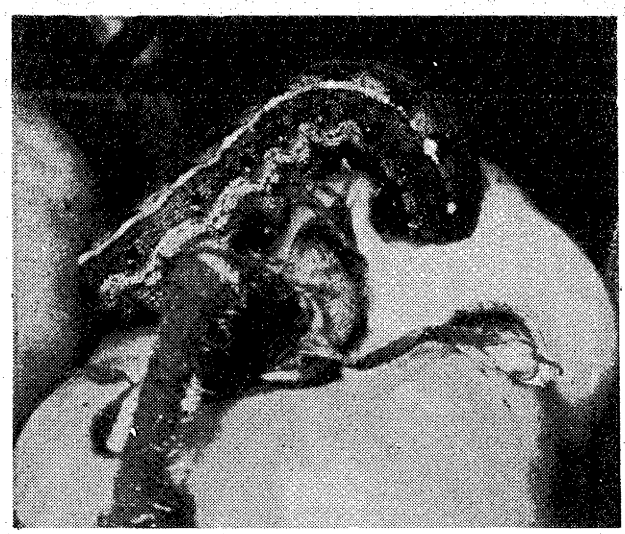
Heliothis caterpillars cause economic damage to the growing shoots, flower buds, flowers and developing seeds and fruits of several different crops:

Corn

The eggs are usually laid on the silks although later they may be laid at the tip of the cob. The young larvae feed on the silks and then move on to the developing grains. Usually only grains at the tip of the cob are damaged. The damage often allows moisture to enter the cob and moulds can then develop. Other insects may also follow heliothis caterpillars and cause further damage to the cob.

Tomato and capsicum

Eggs are laid on young foliage or on parts of the flowers. The small caterpillars may damage the flowers and so prevent the fruit



*A fully grown heliothis caterpillar feeding on a tomato fruit*

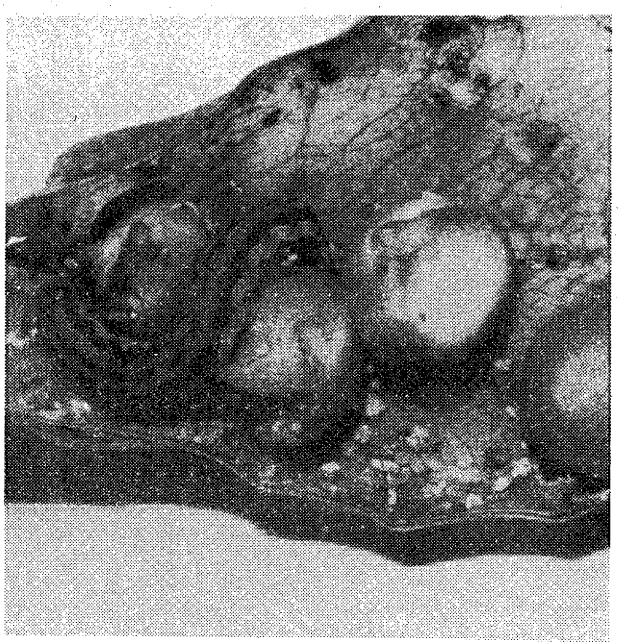
from developing. They can bore into the very small fruits and either destroy them immediately or feed inside them as they grow. Later the large caterpillars emerge from the fruits and bore into other fruits nearby. At this stage the entrance holes are quite obvious and the caterpillars are often found feeding with the rear ends of their bodies projecting from the holes. The damage allows entry of the organisms which cause rotting and the fruit often ends up as a foul smelling liquid mess.

Tobacco

On young plants the eggs are laid on the under surface of the leaves. The young heliothis caterpillars feed on the buds or folded leaves which become badly damaged. Later eggs are laid on flower buds and seed pods and the caterpillars bore into these.

Legumes

Heliothis caterpillars feed on a range of legumes including peas, dwarf beans, mung beans, pigeon peas and soya beans. Eggs are laid on young tissue and the young caterpillars feed on the growing points and leaves. Later they eat the flowers and feed on the outside of the pods, or they bore into the pods to feed on the developing seeds. Often they can be found with the rear part of their bodies projecting from the entrance holes.



*Damage to peas caused by heliothis*

Sorghum

See Entomology Bulletin No. 35.

## CONTROL

When control is necessary the application of insecticides is the only method recommended at the present time. The insecticides currently recommended by the Department of Primary Industry are acephate, carbaryl and permethrin. The recommendations for each crop are as follows:

Corn

Heliothis caterpillars usually only damage the ends of the cobs. This damage makes the cob look unattractive, but if the damaged portion is removed it is often found that the actual loss of edible grain is small. Therefore it is often not worth spraying corn with insecticides to control heliothis caterpillars. In addition, the application of insecticides is difficult, because fully grown corn is so closely spaced and is very tall.

However if, in certain circumstances, insecticide control is required, the current recommendation is to apply a small amount of 5% carbaryl dust to the end of the cob at silking.

Tomato and capsicum

There are two different recommendations for the control of heliothis caterpillars on tomato and capsicum.

1. acephate 0.1%
2. permethrin 0.01%

Whichever of these you decide to use, it should be sprayed onto the plants every week from the start of fruit set.

Tobacco

D.P.I. has no recommendations at present for the control of heliothis caterpillars on tobacco.

Legumes

To control heliothis caterpillars on legumes

use one of the following:

1. acephate 0.1%
2. permethrin 0.01%

These should be sprayed as the pods appear.

Sorghum

The recommended insecticide for control of heliothis is acephate sprayed on at a concentration of 0.1%. For details of the control of heliothis on sorghum, see Entomology Bulletin No. 35.

How to mix the insecticide

The above recommendations are given as particular concentrations of spray mix expressed as a percentage (e.g. acephate 0.1%). The following are instructions for mixing the various concentrations recommended.

1. To obtain acephate 0.1% mix together:

| |
|---|
| 13 g Orthene 75% SP<br>10 litres of water |

2. To obtain permethin 0.01% mix together:

| |
|---|
| 10 ml Ambush 10% EC<br>10 litres of water |

OR

| |
|---|
| 2 ml Ambush 50% EC<br>10 litres of water |

A commercial wetting agent should be added to each of the above at the rate specified on the label. If this is not available 2.5 ml of washing up liquid can be added to each 10 litres of spray.

The waiting period (the minimum period between the last application and harvest of the crop) for each of the above is 3 days.

For corn the recommendation is 5% carbaryl dust. When you buy this it will already be mixed to the correct concentration. It should be applied as a dust. You should NOT mix it with water so that you can spray it.

For further details on the mixing and spraying of insecticides you should consult Rural Development Handbook No. 18, 'The Safe and Efficient Use of Pesticides' by J.A. Sutherland. This is available from D.P.I. Publications Section (address below).

## FURTHER READING


Anon. (1976). Heliothis caterpillars. *Entomology Branch Insect Pest Bulletin 26.* New South Wales Department of Agriculture.

Barrett, J.H. (1967). *Heliothis* species (Lepidoptera:Noctuidae) in Papua and New Guinea. *Papua and New Guinea Agricultural Journal 19* (2): 61-66.

Broaslly, H.H. (1977). *Heliothis...* serious agricultural pests in Queensland. Advisory leaflet No. 1394. Division of Plant Industry, Department of Primary Industries, Queensland. (Reprinted from *Queensland Agricultural Journal 103* (6)).

Dori, F.M. (1984). heliothis caterpillars - a pest of sorghum. Entomology Bulletin No. 34. *Harvest* 10 (4): 164-166.

Sutherland, J.A. (1983). *The Safe and Efficient Use of Pesticides.* Rural Development Series Handbook No. 18, D.P.I., Port Moresby.


## FURTHER INFORMATION

Further information on Heliothis caterpillars can be obtained by contacting the D.P.I. entomologist or didiman nearest to you. Entomologists are based at:

PORT MORESBY
D.P.I., P.O. Box 417,
KONEDOBU
Tel: 214699 Ext 255

LAE
Bubia Agriculture Research Centre
P.O. Box 73,
LAE
Tel: 424933

MOUNT HAGEN
Kuk Agricultural Research Station
P.O. Box 339,
MOUNT HAGEN
Tel: 551377

KIMBE
Dami Oil Palm Research Station
P.O. Box 165,
KIMBE, W.N.B.P.
Tel: 935204

RABAUL
Lowlands Agricultural Experiment Station
P.O. Keravat, E.N.B.P.
Tel: 926251

Copies of this Entomology Bulletin can be obtained from: The Publications Officer, Publications Section, D.P.I., P.O. Box 417, Konedobu.

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